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# PERCEPTIONS OF ESSENTIALITY BY RESPIRATORY TECHNOLOGISTS IN ALBERTA TOWARD THE MEDICAL AND TECHNICAL OBJECTIVES OF THE RESPIRATORY CURRICULUM

by

© MICHAEL BRUCE BARRINGTON ANDREWS

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

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FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled, "Perceptions of Essentiality by Respiratory Technologists in Alberta Toward the Medical and Technical Objectives of the Respiratory Curriculum," submitted by Michael Bruce Barrington Andrews, in partial fulfilment of the requirements for the degree of Master of Education.

Supervisor

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Date . . April 24th . . 1974 .

## ABSTRACT

One new allied health profession to emerge in the last decade was respiratory technology. The emergence of this allied health profession, in part, resulted from technological advances in clinical medicine and increasing pollution of man's environment. To meet the educational needs of this emerging group of workers, The Canadian Society of Respiratory Technologists in 1972 published a document entitled, Curriculum-Respiratory Technology. The purpose of this research was to see if there were significant differences between the perception of essentiality of the curriculum items by general duty respiratory technologists, respiratory supervisory personnel and respiratory instructors in Alberta. The study also sought to identify objectives within the curriculum that were vague or ambiguous and to identify additional topics that were not included in the published curriculum.

A random sample of 29 general duty technologists out of a population of 95, 32 of 36 supervisory personnel, and 11 of 11 instructors participated in the study; all from the Province of Alberta.

The findings of this study indicate that there were no significant differences between the perceptions of the three levels of personnel in 54 out of 64 of the curriculum items identified on the questionnaire. Differences were identified in 10 of the curriculum items with the general duty technologists generally rating an item as more essential than either the instructors or supervisors.

In addition, 57 of the 64 objectives were rated by at least one respondent as unclear or ambiguous with one item receiving criticism

from 16 respondents. Twenty additional curriculum items were also identified by the respondents as necessary additions to the current curriculum.

On the basis of the findings of this study, the following conclusions were drawn:

1. General duty technologists generally rated medical curriculum objectives higher than did either instructors or supervisors.
2. Respiratory technologists in Alberta are not closely involved in the management of anesthetic equipment.
3. The curriculum of The Canadian Society of Respiratory Technologists is in accord with the curriculum perceptions of respiratory technologists in Alberta.
4. The scope of practice of respiratory technology in Alberta is extending beyond the recommended national curriculum.

These conclusions lead to the following major recommendations being made by the researcher:

1. That general duty technologists be represented on the Education and Curriculum Committee of the Respiratory Society.
2. That all the objectives in the respiratory curriculum be rewritten in performance terms.
3. That a panel of experts be struck to examine the identified additional curriculum items for their possible inclusion in the curriculum.
4. That a vigorous ongoing continuing education program be established for practicing respiratory technologists.

5. That the respiratory curriculum receive ongoing review and evaluation.

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# CHAPTER I

## THE PROBLEM

### Introduction

Technological, environmental and societal changes have contributed to the rapid rise in the number of workers involved in the health care delivery system in Canada. At the turn of the century there were 8,000 persons employed in the health care field. By 1961, the number employed in the hospitals alone had risen to 205,000 and, in 1966, the figure reached 272,900 (Government of Canada, 1970). Statistics Canada reported that these figures had reached 316,825 by 1969 (Canada Year Book, 1972, p.320).

Concomitant with the rise in numbers of health care workers there has been a tremendous increase in the type and scope of work involved. One new allied health profession to emerge in the past decade was respiratory technology. The Canadian Society of Respiratory Technologists (1970) defines respiratory technology as:

> An allied health discipline devoted to the scientific applications of technology in order to assist the physician in the diagnosis, treatment, management, and care of patients with respiratory and associated disorders (p.1).

The emergence of this allied health profession partly resulted from technological advances in medicine and increasing pollution of man's environment. In 1952, a five-day inversion of smoke and fog settled over the City of London resulting in 4,000 deaths. New York also underwent a five-day period of air pollution in 1966 which produced increased mortality among persons with pre-existing cardio-pulmonary

disorders (Bates, Christie and Macklem, 1971). After studying the results of these and other severe incidents of air pollution, investigators concluded that:

1. Effects were localized to the respiratory tract.
2. Persons most affected were those with pre-existing cardio-pulmonary disorders.
3. Meteorological conditions were an important factor.
4. A variety of pollutants were responsible for the health hazard.

Concurrent with the increase of air pollution in urban centres there has been a great increase in the availability of complex machinery and instrumentation for the treatment of cardio-respiratory disorders. Scott (1973) comments:

> Since the early 1950's it has been recognised that respiratory failure was not inevitably the end of life. Sophisticated equipment was capable of supporting life until disease could be treated or until it abated. The lessons learned from the last great polio epidemics were to provide powerful impetus to the development of the new technology of respiratory support (p.34).

Miller (1973) is considerably more explicit about the development of respiratory technology. In the opening remarks of his keynote address to the Annual Meeting of The Canadian Society of Respiratory Technologists held in Edmonton, July, 1973, he stated:

> Respiratory therapy is the most rapidly growing allied health profession in North America today. The reasons for this growth are three-fold and basically are the same as for all fields of allied health care.
>
> First, the development of new knowledge stimulates increased interest in respiratory health and improves recognition of respiratory disorders.

> Second, new knowledge also provides better understanding of the nature of physiologic alterations and points the way to improved treatment.
>
> Third, the introduction of new activities for evaluation and treatment promptly reveals the inadequacy of existing manpower to meet the demands for these services (p.31).

The problem of manpower shortage posed by Miller's third reason for the development of the allied health profession has received much attention across Canada. Since 1967, Alberta, Ontario and Quebec have established schools of respiratory technology within their respective college systems. British Columbia, Manitoba and Nova Scotia do have in-hospital programs for the training of respiratory technologists. Two of these provinces are contemplating the integration of the respiratory technology programs in their college system.

The expansion of educational offerings in respiratory technology has placed a burden on respiratory educators as to what it is they are to teach. Lynne-Davies (1972) comments:

> Expanding medical technology has demanded that students be trained today to a standard which will guarantee their competence to function effectively tomorrow. Nowhere does this present a greater challenge than in the field of respiratory technology, which has developed in less than two decades, from a specialty more limited than most in its geographic availability and clinical scope, to widely available and highly specialized clinical discipline (p.26).

It became clear as more programs were developed that a national respiratory curriculum was essential if the various institutions were to turn out adequately trained individuals.

When The Canadian Society of Respiratory Technologists was incorporated in 1964 by the federal government, the following statements were published in the by-laws as the primary objectives of the Society.

a) To encourage and develop training programs for those persons interested in the profession of respiratory technology;

b) To advance the skill and art of respiratory technology through institutes, lectures, and the preparation and distribution of a newsletter and other materials;

c) To aid in the advancement of the technical and therapeutic aspects of the profession of respiratory technology;

d) To operate under the direction of The Canadian Medical Association and The Canadian Anesthetist Society any and all examinations as are necessary for the qualification and registration of respiratory technologists, as members of the Society (p.2).

In order that the above objectives would be achieved by the Society, a number of committees were formed and charged with specific responsibilities. A key committee formed to meet the educational objectives of the Society was the Education and Curriculum Committee. The terms of reference of this committee were outlined in the 1969 minutes of a meeting held in Calgary and are as follows:

1. To encourage and develop all training and continuing education programs for those persons interested in the profession of respiratory technology.

2. To aid in the advancement of the technical and medical aspects of the profession of respiratory technology by recommending specific standards.

3. To maintain an awareness of all changes in the field of respiratory technology.

4. To inform all approved training centres and related committees of all decisions made by the Education and Curriculum Committee (p.4).

The first major undertaking of this committee was the complete revision of the medical and technical curriculum which was compiled by a group of physicians in Toronto in 1966. In order that the new

curriculum would adequately reflect the ideas and trends of the major medical training centres of Canada, the Education Committee was struck from individuals representing the major schools of respiratory technology in the country. A majority of the members of this committee were instructors at the various educational institutions. Additional expertise was provided by two physicians who were actively involved in respiratory technology education. Each member of the committee was invited to submit to the chairman their ideas on what should be included in a comprehensive respiratory curriculum. After much condensation, a new curriculum was submitted by the committee for publication to The Canadian Society of Respiratory Technologists in August, 1972.

To date there has been no meaningful research into the adequacy or relevance of the new curriculum although most programs of respiratory technology purport to follow closely the material and objectives outlined in the curriculum (Lynne-Davies, 1972, p.26).

## Statement of the Problem

It was the major concern of this study to determine and compare the perceptions of essentiality held by general duty respiratory technologists, respiratory supervisory personnel and instructors in Alberta toward the medical and technical objectives of the respiratory curriculum.

## Need for the Study

A review of the literature revealed a dearth, if not a complete lack of available published information in the area of respiratory curriculum evaluation and development.

When The Canadian Society of Respiratory Technologists published their curriculum, the following comments were included in the foreword:

> The continued upgrading of the technical and medical curriculum is an important concept in the development of rising national educational standards for respiratory technology. The committee's awareness of the rapidly developing technology, coupled with the newer concepts in education has evolved the concept of an educational program by objectives... Any comments or suggestions by interested parties for the improvement and updating of the objectives and content would be greatly appreciated by this committee (p.1).

In the minutes of the July, 1973 meeting of The Canadian Society of Respiratory Technologists (Education and Curriculum Committee) held in Edmonton, considerable concern was expressed by the members of the committee on the lack of feedback on the recently developed curriculum.

The chairman of the committee urged all members to solicit information and commentary on the curriculum in order that it reflect changing concepts within the profession.

The results of this study should provide feedback from practising general duty technologists, supervisory personnel and instructors as to their perceptions of essentiality of the sub-elements of the 1972 curriculum. Such information should provide a basis for validation and for updating the national curriculum for respiratory technologists.

## Definition of Terms

The following definitions were selected for terms that will be used throughout this study.

Respiratory Technologist refers to a person who is employed full time in a general hospital as a general duty respiratory technologist and holds a valid certificate of registration from The Canadian Society of Respiratory Technologists. This definition is derived from the Alberta Hospital Association's salary agreement schedule 1971.

Supervisory Personnel refers to persons employed full time in a general hospital within the department of respiratory technology in an administrative capacity other than an instructor and holds a valid certificate of registration from The Canadian Society of Respiratory Technologists.

Instructor refers to a person employed full time to instruct in respiratory technology in either an institute of technology or a hospital and who holds a valid certificate of registration from The Canadian Society of Respiratory Technologists.

Respiratory Technology is an allied health discipline devoted to the scientific applications of technology in order to assist the physician in the diagnosis, treatment, management and care of patients with respiratory and associated disorders, (Canadian Society of Respiratory Technologists, 1970).

Curriculum is a plan or design for the educational program of a school or a system of schools. It should be stated in a written document and made available to teachers and patrons of a school (Beauchamp, 1962, p.224).

Respiratory Curriculum refers to the material contained within the booklet entitled Curriculum - Respiratory Technology as published by The Canadian Society of Respiratory Technologists (1972).

Curricular Sub-Elements refer to the general objectives which give direction to educational intents that are contained within the booklet entitled Curriculum - Respiratory Technology (1972).

General Hospital refers to an institution that provides multi-faceted health care and does not limit patient admissions to specialized medical cases. This definition is derived from Georgopoulos and Mann, (1962, p.5).

## Objectives of the Study

The major objective of this research was to determine the perceptions of essentiality of respiratory technologists in the Province of Alberta with respect to the curricular sub-elements.

The specific objectives were:-

1. To determine to what extent, if any, there were sub-elements of the curriculum which, in the opinion of general duty respiratory technologists were of minor importance.
2. To determine to what extent, if any, there were sub-elements of the curriculum which, in the opinion of respiratory supervisory personnel, were of minor importance.
3. To determine to what extent, if any, there were sub-elements of the curriculum which, in the opinion of respiratory instructors, were of minor importance.
4. To determine if there were any significant differences between the perceptions of essentiality of the three

levels of personnel practising as registered respiratory technologists.

5. To identify curriculum items that are not included in the current respiratory technology curriculum but are of importance in the opinion of the respondents and should be included in such a document.
6. To determine which of the curricular sub-elements are ambiguous or vague in their meaning.

## Central Assumption

Central to this study the assumption was that the curricular sub-elements as identified by the objectives found within the total curriculum represent the essential elements which must be learned by all students of respiratory technology in order to practise the profession; and these sub-elements constitute essential curricular skills within the perceptions of the general duty technologists, supervisory personnel and respiratory instructors.

## Delimitations

This study was delimited in the following ways:

1. It was restricted to respiratory technologists employed in the Province of Alberta in February, 1974.
2. It was restricted to persons holding a valid certificate of registration from The Canadian Society of Respiratory Technologists.
3. It was restricted to the curricular sub-elements identified in the technical and adult medical sections

of the curriculum published by The Canadian Society of Respiratory Technologists.

## Questions to be Answered

Are there any significant differences between the perceptions of essentiality of the three levels of personnel practising as registered respiratory technologists with respect to the curricular sub-elements? To answer this question, 64 null hypotheses were established, one for each of the curricular sub-elements identified in the questionnaire (See Appendix B).

The 64 null hypotheses state that: there is no significant difference in the perception of essentiality of the three levels of personnel (for each curricular sub-element).

# METHODOLOGY

## Instrumentation

The instrument used was developed by the researcher using a modified Likert scale as described by Englehart (1971, pp.177-8). A pilot study was carried out by the researcher who administered the questionnaire to a group of second year respiratory technology students at the Royal Alexandra Hospital who were not part of the sample used in the final research. These students encountered minor difficulties in completing the research instrument and made certain recommendations which were incorporated into a modified version of the instrument. The modified questionnaire was considered acceptable for use with those registered respiratory personnel who would be involved in the research.

## The Population and Sample

The total population involved in this study consisted of all the registered respiratory technologists in the Province of Alberta who hold a valid certificate of registration from The Canadian Society of Respiratory Technologists. This population was divided into three discrete samples - the general duty staff, supervisory personnel and instructors.

The sample which represented the general duty practising technologist was selected from all hospitals in the Province of Alberta employing such individuals on its staff. The hospitals that participated were identified from the Alberta membership list as provided by The Canadian Society of Respiratory Technologists, January, 1974. The sample for this investigation was obtained by inviting two persons, or 20 percent (whichever figure was higher), of the total registered general duty staff in each hospital to participate in the study.

All the supervisory personnel and instructors in all the hospitals and two institutes of technology were involved in the investigation. Chapter III provides a detailed account of how each sample was selected.

## Data Collection

The department heads in the participating hospitals were contacted by the researcher, by letter, to acquaint them with the purpose of the study and to solicit their support and cooperation. (A copy of the letter is appended as Appendix A). Each department head agreed to accept the responsibility of administering the questionnaires to all

those persons in his hospital who were selected as part of the research population. The department heads also agreed to ensure that the completed questionnaires would be returned, in sealed envelopes, to the researcher for analysis.

Data Analysis

Data from the completed questionnaires were processed to produce the necessary analysis of variance, homogenity of variance test chi-square, and probability. The level of significance chosen was $P = 0.1$ and the responses from all the items which yielded results at the 0.1 level were analysed to determine the findings of this study. This analysis is discussed in detail in Chapter III.

## ORGANIZATION OF THE THESIS

This chapter has presented, (1) an introduction to the problem, (2) the need for the study, (3) the definition of terms, (4) the objectives of the study, (5) the central assumption, (6) the delimitations, (7) the question to be answered, and (8) the outline of the methodology.

Chapter II reviews the related literature. It includes, (1) a review of the literature to determine the definition of the term curriculum, (2) a review of contemporary concepts of curriculum development theory and (3) a review of research related to curriculum change and improvement as it applies to this study.

The third chapter is concerned with the methodology used in the study and consists of four sections. The first deals with instrumentation; the second with the population and samples; the third with

the collection of the data; and the fourth with the analysis of data yielded by the research instrument.

The fourth chapter presents and discusses the findings of the study, while the last chapter deals with the conclusions and recommendations derived from this study.

## CHAPTER II

## REVIEW OF RELATED LITERATURE

This chapter is composed of three sections which involve library research of research studies and literature related to the study. The first section is a review of the literature to determine the definition of the term "curriculum". The second section is a review of contemporary concepts of curriculum development theory. The final section is a review of research related to curriculum change and improvement as it applies to this study.

### "Curriculum" Defined

Many individuals concerned with education on a wide variety of levels are unclear about what it is they mean about the term "curriculum". Short and Marconnit (1968) state:

> Curriculum is that concept in which most of the concerns of teachers, learners, administrators, parents and the public at large come to focus when they think of schooling. It is a concept with rich and puzzling relationships, which at times defy analysis, and yet it seems to be necessary to the conduct of thought about education programs. To call curriculum a problem is to say much more than that the matter of what to teach and what shall be learned is forever being re-examined; it is to say that even the concept curriculum itself often eludes our understanding. It is indeed intellectually challenging to think about and indeed a favorite pastime of most educators (p.1).

Babin (1973), Beauchamp (1968) and Oliver (1965) all concur that unless a clear definition of "curriculum" is established then any direction taken in curriculum preparation is likely being built on an unstable foundation. Beauchamp (1968) comments:

> The important term for curriculum theory is 'curriculum'. From a theoretical point of view, it is impossible to develop subordinate constructs, or relationships, with other components of education until ground rules are laid down through meanings ascribed to the basic term 'curriculum' (p.66).

Babin (1973) expresses another major concern in that "if curriculum is too narrowly defined by educators, their investigations will be restricted; if curriculum is too loosely defined, investigations may be inhibited" (p.45).

A review of several current definitions of curriculum serve to illustrate the problem alluded to by Beauchamp and Babin. The Ontario Association for Curriculum Development express curriculum as "the process through which the child learns in school" (p.1).

Saylor and Alexander (1966) state "curriculum encompasses all learning opportunities provided by the school" (p.5).

In this viewpoint the "curriculum" and the "program" of a school are considered synonymous. Robert E. Stake (in Tyler, 1967) also provides a similar definition with this statement "Curriculum is an educational program" (p.4).

Mauritz Johnson (1967) takes issue with these definitions because they imply that curriculum is consonant with "planned learning experiences". In defence of his position he comments:

> This definition is unsatisfactory however, if 'curriculum' is to be distinguished from 'instruction'. Whether experiences are viewed subjectively in terms of the sensibility of the experiencing individual or objectively in terms of his actions in a particular setting, there is in either case no experience until an interaction between the individual and his environment actually occurs. Clearly, such interaction characterizes instruction, not curriculum (p.174).

In a more recent article Johnson (1969) clarifies his definition of the term "curriculum" when he wrote "it is a structured series of intended learning outcomes" (p.118).

In leading up to this definition of the term "curriculum" this authority commented that "if curriculum serves any purpose, they are to guide instruction and to furnish criteria for evaluation. Curriculum, therefore, must be a statement of intention not a report of occurrences or results" (p.115).

Johnson goes on to refer to the concept of "translation of curriculum into instruction" and states that "far less agreement exists as to what curriculum and instruction are and how they relate to each other" (p.115). This authority on curriculum theory believes that much of the confusion that arises about the term "curriculum" could be avoided if a more clear-cut distinction could be maintained between curriculum and instruction.

Hersom (1972) in an analysis of Johnson's viewpoint elucidates:

> Clearly, if such a definition of curriculum were to be adopted it would have some rather far-reaching implications for the role expectations held for teachers, and for the development of curriculum generally. But as helpful as Johnson's distinction between curriculum and instruction may be when describing what curriculum is and what it is not, in practice it appears to be extremely difficult to maintain such a clear-cut distinction. The spillover seems unavoidable, for how does one think about intended outcomes without thinking of pupils and the effects on pupils' lives? And how can one think about the quality of life without describing it in terms of certain experiences, skills, knowledge, and understandings? At one level it may be possible to maintain a general concept of 'intended outcomes' but if the concept is to be meaningful for the researcher or for the practitioner, the general outcomes must be translated into specifics, and the distinction between curriculum and instruction becomes blurred immediately (p.42).

A decade earlier Hilda Taba (1962) in writing on curricular theory expressed concern in that a number of problems arise when curriculum and instruction are separated. Taba wrote:

> ... excluding everything from the definition of curriculum everything except the statement of objectives and content outlines and relegating anything that has to do with learning and learning experiences might be too confining to be adequate for a modern curriculum (p.9).

Beauchamp (1968) offers a succinct summary of the ways in which the term "curriculum" is used in curriculum literature:

> ... the word 'curriculum' is used in three key ways. One use of the word 'curriculum' is as a substantive phenomenon. In the frame of this usage, one talks about a curriculum. In most cases a curriculum is a plan of some kind...
>
> A second use of the word 'curriculum' is as a synonym for a curriculum system. A curriculum system is the organized framework within a school or a school system within which all curriculum decisions are made...
>
> A third use of the word 'curriculum' is as a synonym for an area of professional study. This mode is to speak of curriculum as a total field of study (p.68).

The Canadian Society of Respiratory Technologists and The American Association for Respiratory Therapy both concur that the term "curriculum" means a plan of some kind. The American Association is quite explicit in its document Essentials of an Approved Education Program for the Respiratory Therapist, 1972 as to the elements that should be included in a curriculum. According to this document the Association views curriculum in the following ways.

C. Curriculum:

1. A copy of the complete curriculum should be kept on file.
2. Copies of course outlines, class schedules, student experience, assignments, and teaching plans should be kept on file and available for review.

3. Records of actual courses taught to students, kept in a fashion consistent with the overall policy of the educational institution, should be available for review.

4. Records of the results of practical and written examinations as well as copies of questions should be maintained along with evidence of periodic evaluation of examination materials and procedures (p.682).

It can be implied from these four statements that curriculum includes general objectives, instructional materials and time schedules but the American Association does not publish a curriculum guide per se other than to stipulate that the minimum length of training be two years. The Association does provide certain topics for instruction but is remiss in the area of specific instructional objectives and instructional methodology. Such major curriculum decisions are left to the individual schools teaching respiratory therapy.

The Canadian Society of Respiratory Technologists provides a guide which is labelled Curriculum - Respiratory Technology and within the foreword of the document it states:

> The Committee's awareness of the rapidly developing technology coupled with the newer concepts in education has evolved the concept of an educational program by objectives. Fundamentally both the educator and student must have a precise idea of what the change in the student's behaviour shall be.
>
> The methods by which these objectives are achieved are the individual concern of each training center and respective provincial departments of education. The suggested minimum instructional time is offered to the schools only as a guide to their individual programs, as is the basic content provided herein (p.1).

This statement implies a structured series of learning outcomes that must be taught to the student and can be placed at the Johnson end of the continuum of definition for the term "curriculum".

Taba (1962, p.10) would disagree with the placement of the curriculum of The Canadian Society of Respiratory Technologists with the Johnson definition for the term "curriculum". In Taba's view a curriculum should contain a statement of aims and objectives, selection and organization of content, patterns of instructional methodology, and a set of evaluative criteria. The curriculum of The Canadian Society of Respiratory Technologists does possess a statement of aims and it also includes the organization of content to be taught. It lacks patterns of instructional metholology and evaluative criteria to be used to determine if the objectives have been achieved.

From the review of the literature, the viewpoints of authorities vary as to the manifestations of the term "curriculum" and the basic components of a curriculum. It can be seen that there are a number of authorities that would concur that the definition conceptualized by Beauchamp (in Short and Marconnit, 1968) is an acceptable workable definition:

> 'Curriculum' is used to identify the plan or design for the educational program of a school or a system of schools. It represents the agreements of a particular group relative to what an educational program should attempt to accomplish. It should be stated in a written document and made available to teachers and patrons of the school (p.224).

In addition, Beauchamp outlines four components that should characterize the curriculum:

1. ... a statement of use that is expected to be made of it.

2. ... the curriculum contains a statement of the purposes of the school program.

3. ... the curriculum document is a description of what is to be taught.

4. ... the curriculum is the plan of evaluation that should be utilized to measure its effectiveness (p.224).

Curriculum Development Theory

The first section of this chapter dealt with the problem of teaching an acceptable definition of the term "curriculum" and concluded that the Beauchamp definition contained the essential elements of curriculum as identified by a number of authorities in the area of curriculum theory. This section reviews the literature that is directed toward curriculum development and theory. The review that follows is not exhaustive in that it does not probe the depths of curriculum development theory but identifies the vital parameters essential to a functional curriculum development approach.

Taba (1962, p.6) is explicit that a theory of curriculum development is needed which will define the problem with which curriculum development must deal and, in addition, elucidate upon the system of concepts which are used to assess the relevance of those data to education. Foshay and Beilin (1969, p.276) reiterate that there is a continuing lack of curriculum theory. Hathaway (1970) concluded that:

> ... the lack of a comprehensive curriculum theory is partially the result of pre-occupation with tradition, goals and the means of achieving them, and theory making as an end in itself. Lack of a curriculum theory accents, in part for the inumerable methods being used to formulate programs of learning experiences for students (p.17).

Beauchamp (1968) in his second edition of Curriculum Theory reviews a large volume of curriculum literature and formulates a definite curriculum theory. This authority defines curriculum theory as:

> ... a set of related statements that gives meaning to a school's curriculum by pointing up the relationship among its elements and by diverting its development, its use and its evaluation (p.66).

Beauchamp (in Short and Marconnit, 1968) outlines a series of tasks that a curriculum theorist must address himself to in formulating an adequate curriculum theory.

Firstly the theorist must define needed technical terminology that will permit establishment of definitions that make possible accurate theoretical postulation. Secondly, it is essential that the available pool of knowledge in any given field be classified into classes or categories so that systematic analyses can be readily carried out.

In attempting to formulate a theory, the predictive function of the theory must be considered to be the highest order of theoretical deliberation. Beauchamp states:

> At present, ability to predict in the field of curriculum is limited. In the absence of predictions, assumptions are made that if under certain arrangements a curriculum is planned, and if intelligent method is applied in its implementation, desired outcomes can be achieved (p.225).

The final contribution of theory to curriculum as seen by Beauchamp is that of model-building. A model suggests the kinds of choices that must be made, the decision-making processes, and the essential definitions needed to clarify the theoretical postulate. Beauchamp concedes there are many models conceived by curriculum theoreticians, however, "when a model is used as a guide to curricular choices, and when such choices are expressed, a curriculum theory has been formulated" (p.225).

It is logical that a review of curriculum development theory should begin with an examination of several contemporary models.

Saylor and Alexander (1966, p.7) formulate a model of the process of curriculum planning, Figure 1, which outlines the decision-making processes ranging from the cultural determinants of a curriculum to the learning opportunities provided in the classroom. The model examines the determinants which necessarily dictate the direction taken by the curriculum. This direction provides the guidance from which the curriculum planners may organize the numerous curriculum planning groups necessary to provide the basis of the curriculum. Specialists are then in a position to make decisions regarding appropriate content and organization which are expressed in curriculum plans. It is the plans that Saylor and Alexander label "curriculum". From plans stem

| Curriculum Determinants | | Curriculum Planners | | Curriculum Decisions | | Curriculum Plans |
|---|---|---|---|---|---|---|
| Pupils; social values, structures, and demands; functions and aims of the schools; nature of knowledge; the process of learning — constitute the basic considerations which guide curriculum planners. Data about each of these determinants are related to issues in curriculum planning. | guide | Professional educators at various operational levels, supplemented by pupils and their parents and by outside resources, and influenced by many forces, are responsible for planning the curriculum of elementary and secondary schools. The planners are organized in numerous types of curriculum planning groups to carry out this responsibility. | who make | Decisions are made by the curriculum planners as to characteristics of a good curriculum; organization and selection of curriculum content; and organization for instruction of groups and individuals. Decisions are made at several levels — the state, the school system, the school, and the individual classroom. | which result in | The plans for learning opportunities provided by the school (the curriculum) include arrangements for the organization of the curriculum and instruction, for learning resources, and for specific learning experiences of particular groups of learners and individual learners. Some plans are written to serve as curriculum guides for teachers and others. |

FIGURE 1.

A MODEL OF THE PROCESS OF CURRICULUM PLANNING

Saylor and Alexander (1966, p.7)

the basis for the decision-making process which must take place at the classroom level to provide the specific learning experiences for particular groups of learners.

Mauritz Johnson (1967) provides a model (Figure 2) showing curriculum as an output of one system and an input of another. In keeping with his definition of curriculum as a "structured series of intended learning outcomes" the instructional system is viewed as a separate entity from the curriculum. However, concomitant with Saylor and Alexander, Johnson is concerned with the forces which shape the input into the curriculum development system. In his conceptual system Johnson (1967, p.132) delineates three sources that necessarily provide input into the curriculum.

1. The identifiable needs and interests of the learner.
2. The societal order, its values and problems.
3. Organized knowledge or subject matter.

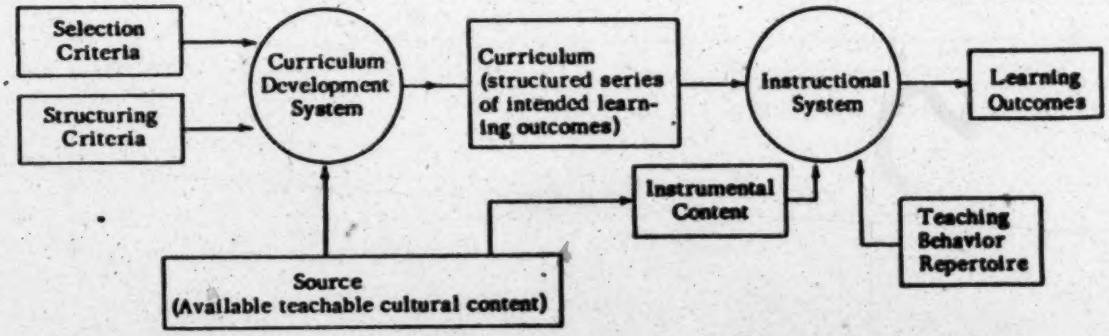


FIGURE 2. A model showing curriculum as an output of one system and an input of another. Johnson, (1967, p.133)

Given these broad sources for the curriculum, selection is made of the items that will comprise the basis for the intended learning outcomes. Johnson is concerned that regardless of who makes the

selection, the criteria used must be explicit. This authority on curriculum theory makes a clear distinction between training and education when he wrote: "Training implies learning for use in a predictable situation; education implies learning for use in unpredictable situations".

The development of a training curriculum begins with a job analysis in which the tasks to be performed and the knowledge, skills and attitudes needed to perform them are identified. An educational curriculum is developed by selecting among and within these disciplines those components which analysis identifies as having the greatest potential interpretive value. Such a distinction has important implications for curriculum decision-making in the selection of curriculum items.

Coder (1972) approaches curriculum development through a conceptual-analog model (Figure 3) which systematically analyses curriculum development as a process in which "a fluid system of interacting stages and various influential forces" (p.136) which move toward a tentative curriculum plan. He concluded:

> The proposed curriculum planning model has attempted to indicate one perspective of curriculum development within educational institutions, taking into consideration the important role of curriculum decision-making (p.136).

The process of curriculum planning involves the curricular decision-making of students, teachers, administrators, and other individuals and groups at various organizational levels. (Coder, p.139)

Taba (1962, p.10) delineates a series of elements which she considers to be essential to curricula and curriculum development theory. The position taken by Taba on curricular development theory models

A SCHEMATIC DIAGRAM OF THE FIVE STAGES

OF A PROPOSED CONCEPTUAL-ANALOG MODEL

| | | |
|---|---|---|
| **STAGE 1** | **STAGE 1A** | **STAGE 1B** |
| ESTABLISH CONVERGENT ACTION COMMITMENT TO BE ACHIEVED | RESULTANT CONVERGENT VECTOR FORCES OF CURRICULUM THEORIES | TENTATIVE CONVERGENT CURRICULAR PLAN |
| **STAGE 2** | **STAGE 2** | |
| IDENTIFY DIVERGENT LEARNER CONCERNS | TENATIVE EMERGENT CURRICULUM DIAGNOSES | |
| **STAGE 3** | **STAGE 3** | |
| SELECT/DESIGN/ PRODUCE MOST FEASIBLE EMERGENT ACTION SOLUTION PLANNING | RELEVANT EMERGENT CURRICULUM PLANS | |
| **STAGE 4** | **STAGE 4** | |
| IMPLEMENT ACTION SOLUTION PLANNING | EMERGENT INSTRUCTIONAL PLANS | |
| **STAGE 5** | **STAGE 5** | |
| EVALUATE & REVISE ACTION PLANNING AS REQUIRED | FORMATIVE & SUMMATIVE EVALUATION & REVISION | |

FIGURE 3.

PERSPECTIVES OF CURRICULUM

Modified from Coder, p.135

previously discussed is similar to that of Tyler (1949, pp.1-2). This authority identifies the elements as a statement of aims and objectives; selection and organization of content; patterns of learning and teaching; and evaluation of the outcomes. Taba specifies what must be considered but alludes to differences which will occur between the elements in accordance with the emphasis given to each of the elements. On this issue Taba (1962) wrote:

> If curriculum development is to be a rational and a scientific rather than a rule-of-thumb procedure, the decisions about these elements need to be made on the basis of some valid criteria. These criteria may come from various sources, from tradition, from social pressures, from established habits. The differences between a curriculum decision-making which follows a scientific method and develops a rational design and one which does not, is that in the former the criteria for decisions are derived from a study of the factors constituting a reasonable basis for the curriculum. In our society at least, these factors are the learner, the learning process, the cultural demands, and the content of the disciplines. Therefore, scientific curriculum development needs to draw upon analyses of society and culture, studies of the learner and the learning process, and analyses of the nature of knowledge in order to determine the purposes of the school and the nature of its curriculum (p.10).

The models presented thus far have been directed at the school system K-12 although the concepts are general in nature and applicable to all curriculum development processes. Hathaway (1970) offers a network-based approach to curriculum development specifically for vocational education programs of study. The approach that Hathaway used is based upon program, evaluation and review technique (PERT) as the basis for curriculum development. In developing his theoretical framework Hathaway presents a model of curriculum development (Figure 4) which incorporates the major elements as identified by Taba (1962). Fundamental to the network-based approach to curriculum development is

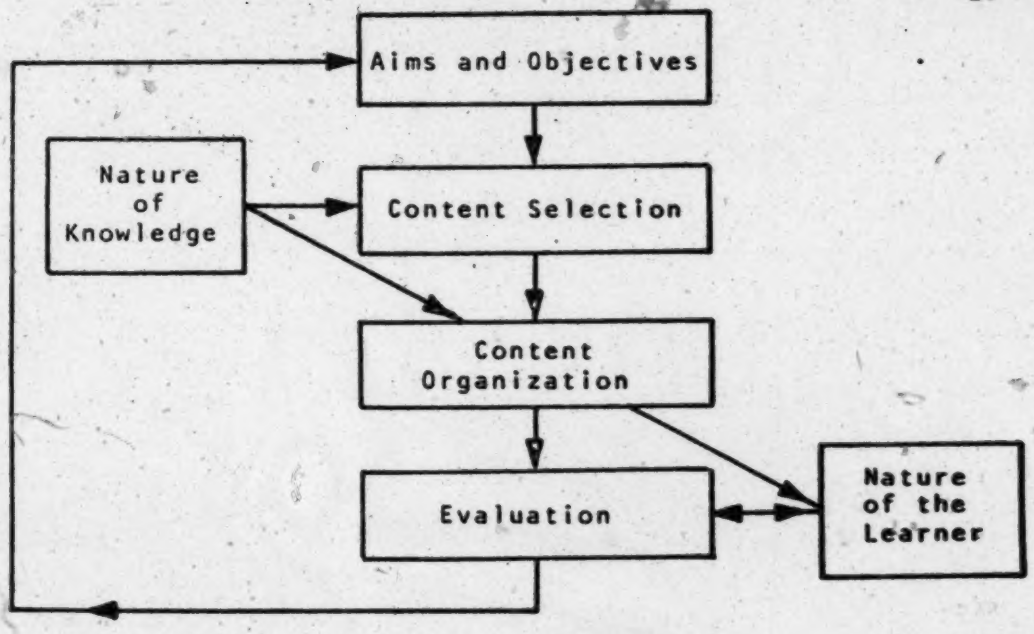


FIGURE 4.

A MODEL OF CURRICULUM DEVELOPMENT

(Hathaway, p.23)

communications. Hathaway sees PERT as an excellent means to overcome communication barriers which occur in many curriculum development models. He defended his position when he wrote:

> PERT is a means of graphic communication which concurrently offers a straight forward approach to program planning. It utilizes a method of task division which assigns each program participant with specific goals or objectives. These goals or objectives give rise to activities which can be arranged into networks and manipulated to optimize time/resource expenditures... Individually developed networks can be combined into larger networks until management has a completely specified plan for pursuing specific goals (p.34).

A review of the literature and an examination of models presented reveal a number of common elements that appear essential to curriculum development theory.

1. Statement of aims and objectives
2. Selection of content
3. Organization of content
4. Evaluation of outcomes

Essential to the above are issues such as the nature of knowledge to which the curriculum must necessarily direct itself toward, the decision-making process, and communication systems.

Curriculum Elements - Aims and Objectives

Taba (1962) opens a discussion on the objectives of education with the following statement:

> An educational program, like any activity, is directed by the expectations of certain outcomes. The chief activity of education is to change individuals in some way; to add to the knowledge they possess, to enable them to perform skills which otherwise they would not perform, to develop certain understandings, insights and appreciations. The statement of these expected outcomes are usually called either education aims or educational objectives (p.194).

In order to clarify the confusion that exists between aims and objectives, Bacchus (1972) offers a model which provides for different levels of generality that are commonly used by curriculum theorists (Figure 5).

Taba (1962), Saylor and Alexander (1966), Tyler (1967), and Bacchus (1972) agree that it is important to differentiate between aims and objectives. Aims of education are statements that encompass the highest level of generality. Curriculum aims are usually statements that provide an orientation to the major emphasis of the curriculum or education program. Cox (1972) states:

> One of the most difficult tasks confronting educators during this decade must surely be the necessity to reach conclusions concerning the fundamental purposes of education (p.15).

Taba (1962, p.195) also alludes to this concern in outlining the dichotomy between those who feel the needs of technological society should dominate as the purpose of education to those who think the greatest need is that of rationalization of human existence and the democratic way of life. Regardless of the viewpoint adhered to, researchers are in agreement that formulation of clear aims and objectives are essential to provide an adequate platform for the development of the curriculum.

| | |
|---|---|
| FIRST LEVEL | CURRICULUM AIMS |
| | - Belief system of institution<br>- Social forces<br>- Overall purpose of curriculum |
| SECOND LEVEL | GENERAL OBJECTIVES |
| | - Curriculum content<br>- Programs of study |
| THIRD LEVEL | SPECIFIC OBJECTIVES |
| | - Curriculum content for specific programs |
| FOURTH LEVEL | BEHAVIOURAL OBJECTIVES |
| | - Actual learning activities<br>- Lessons to achieve objectives<br>- Projects |

FIGURE 5.

LEVELS OF GENERALITIES OF AIMS AND OBJECTIVES

Modified from Bacchus, p.7

Important to the concept of curriculum development is that the aims and objectives serve as the basis of curriculum planning and the target toward which the educational processes direct themselves. The objectives are the ends that provide the clue to learning (the means). Hathaway (1970) clarifies the distinction between aims and objectives when he wrote: "Specific objectives, sub-objectives and ultimately teaching experiences stem from the global aims and objectives in a pyramidal fashion" (p.25).

It is reasonable to conclude from the evidence presented that, although there are many viewpoints on the type of aims and objectives used in curriculum theory, they provide the basis from which the curriculum may be formulated and ultimately guide the learning strategies incorporated to achieve the desired goals of the curriculum. Researchers agree that the clearer the aims and objectives, especially those objectives arranged in a hierarchical order, the better the curriculum.

## Selection of Content

Smith, Stanley and Shores (1957, p.132), Taba (1962) and Johnson (1968, p.73) agree that content selection is necessarily dictated by the program objectives and priorities. They imply agreement with the model presented in Figure 4 in that a top-down approach to curriculum planning is essential where aims dictate objectives which ultimately sub-divide into specific classroom behavioural objectives. However, Smith, Stanley and Shores (1957, p.131) warn that although objectives, especially those couched in terms of expected behaviours, should provide the basis of content selection; two important reasons

dictate that other criteria for selection of content be examined. The first is that objectives are seldom carefully thought out or stated as clearly as this method requires and secondly, educational measurement is a relatively new science where evaluative instruments are not yet adequately developed to assess a large number of objectives.

Taba (1962) is clear that in any discussion of curriculum "it is important to understand that the curriculum consists of different things: the content and the learning experiences, or the mental operations that students employ in learning content" (p.265). Inlow (1966, p.15) agrees with this viewpoint in that it is impossible to separate content from the learning process, especially when one adheres to the definition of a curriculum as a plan for learning. Johnson (1968, p.74) also outlines the problem that with the ever-expanding field of knowledge available to man, decisions have to be made as to what will be included or excluded from the curriculum. Taba (1962) states that "Curriculum content should be valid and significant, ... in one sense curriculum content is valid and significant to the extent that it reflects contemporary scientific knowledge" (p.267).

It is clear from the brief review of some of the thoughts of curriculum theorists that content selection is not straight forward but involves a number of issues. Inlow (1966, pp.23-27) contends that content be selected on the basis of: educational goals and their centrality in the program, essentiality and universality, nature of man, nature of the universe, and balance. In addition these criteria are balanced by a vertical sequence which must consider pupil readiness and agency appropriateness. Johnson (1968, pp.74-75) suggests that the

criterion for content selection include: significance, relevancy, interest, and democratic value orientation. Smith, Stanley and Shores (1957, p.132) offer a similar set of standards that they feel should be adhered to in making decisions of content selection. They include: significance, test of time, usefulness, interest, and value to democratic society. Taba (1962, pp.267-84) proposes that the criteria for selection include: validity and significance, usefulness, balance of breadth and depth, provision for achievement of a broad range of objectives, learnability and adaptability, and appropriateness to the needs and interests of the learner.

Hyman (1973, p.13) brings these issues into clear perspective in that any teacher or curriculum planner must establish criteria that establishes curriculum focus. As one formulates a curriculum focus to propose to others, the objectives and criteria underlining that focus become manifested. Hyman comments that the "curriculum focus is the outward manifestation of many curriculum decisions" (p.13). One must have a clearly established set of criteria that will permit a meaningful selection of content.

Content Organization

Historically, content organization and curriculum design have evolved from the characteristics found in different types of curriculum. Beauchamp (1968, p.86) identifies a number of familiar curriculum designs as the separate-subjects curriculum, the correlated curriculum, the broad-fields curriculum, the activity curriculum, problem of living curriculum, the persistent life curriculum, the core curriculum, the

experience curriculum, and the emergent curriculum.

Theoretically, each type of curriculum calls for a different organization of subject matter. However, researchers such as Tyler (1949, p.84), Taba (1962, p.292), Smith, Stanley and Shores (1957, p.226), and Saylor and Alexander (1966, p.182) agree that there are certain major criteria to be met which are common to a number of designs of curriculum in terms of organization. These are: continuity, sequence and integration. Continuity refers to the vertical integration of the major curriculum elements. Sequence emphasizes the necessity for having one learning experience which builds on a previous one to permit a broader and deeper investigation of the topic under consideration.

Bruner (1967) outlines the importance of sequence and its complexity.

> There are usually various sequences that are equivalent in their ease and difficulty for learners. There is no unique sequence for all learners, and the optimum in any particular case will depend upon a variety of factors, including past learning, stage of development, nature of the material, and individual differences (p.49).

Integration is the horizontal relationship of the curriculum experiences which should permit the learner to unify his view of the total curriculum. Tyler (1949) states that these "are basic guiding criteria in the effective scheme of organization of learning experiences" (p.86).

Notwithstanding the three basic criteria, Saylor and Alexander (1966) offer four bases that could be used to select and organize content.

a) Subject centred
b) Societal centred
c) Learner centred
d) Job centred (p.186)

Their viewpoint is that curriculum planners must firstly establish what is the basic mode of organization of content then consider the logical order, the psychological order, sequential development, and the structure of the content itself.

Beauchamp (1968) offers the following conclusion on the subject of selection and organization of content.

> Careful designed research is badly needed in the area of selection and organization of subject matters. Most curriculums at the present time appear to follow identical patterns. They are subject centred, and they are vertically arranged. Too little attention has been paid to horizontal articulation of subject matters within schools and grades. If we ever are to capitalize upon the common, or greatly similar, elements in the various subjects or disciplines that we are to teach, something resembling fusion of subject matter will have to be reflected in curriculum design (p.104).

## Evaluation

Experimentation and evaluation are essential components of the curriculum improvement process and when effectively carried out lead to program revitalization and improvement. (Anderson, 1965, p.218). Taba (1962, p.12) stresses the importance of determining of what to evaluate and the methodology of doing the evaluation.

Beauchamp (1968, p.137) identifies four dimensions of curriculum evaluation:

1. Evaluation of teacher use of the curriculum.
2. Evaluation of the curriculum design.
3. Evaluation of pupil outcomes.
4. Evaluation of the curriculum system.

Although the researcher does identify the four dimensions he states there is a great need to develop systems of evaluation in order to judge the worth of planned curricular systems. Mackay and Maguire (1971, p.16) highlight three models of evaluation; namely those which address themselves to formative evaluation of the learning process and the sequence of objectives; the eclectic model which concerns itself with the collection of data both to answer and raise issues and concerns; finally, the administrative model which collects information for a decision-making process.

The range and activities of the three types of models vary considerably but the one commonality is clearly observable, that is the role of objectives is prominent in all cases.

Bloom, Englebert, Furst, Hill and Krathwohl (1956) provide a taxonomy of educational objectives that consist of a set of general and specific categories that encompass all expected learning outcomes. Elements from within the hierarchy can be used for curriculum development, instruction and evaluation. Mager (1962) and Gronlund (1970) emphasize the need for stating objectives as learning outcomes and defining those objectives in behavioural terms. Such a procedure permits evaluation to be almost Go/No-Go process. If applied to every objective within the curriculum, both the student and the entire program is open to critical evaluation.

Hathaway (1970) concludes in a discussion on evaluation that "... educators pay only lip service to evaluation while most of the theorists include it in their considerations, few plans follow through

with an evaluation cycle that revitalizes the curriculum. Without revitalization the curriculum has a short life indeed" (p.29).

The Respiratory Curriculum

In Canada, there are eight schools offering respiratory technology programs. Each school must be accredited by The Canadian Medical Association/Canadian Society of Respiratory Technologists accreditation of schools committee before graduates are permitted to write national registration examinations. This committee assessed each program on an individual basis and conducted on-site surveys to ensure the accuracy of the documentation provided. The criteria of assessment includes an examination of the curriculum of each school (Lynne-Davies, 1972, p.28). In order to provide guidance for each of the programs The Canadian Society of Respiratory Technologists provides a document labelled "Curriculum - Respiratory Technology".

The review of the literature has identified four fundamental elements essential to any document purporting to be a curriculum.

These elements are:

1. Aims and objectives
2. Content selection
3. Content organization
4. Evaluation schema

For the purpose of this thesis it was necessary to examine the curriculum published by The Canadian Society of Respiratory Technologists to see if it is a curriculum, a curriculum guide, or just a list of suggested content that is desirable for a respiratory technologist to know.

An analysis of this document found the following elements to be present:

1. A general aim or objective (p.2)
2. For each section a series of specific objectives is provided.
3. Content is outlined and organized for each subject.

The document does not provide any specific instructional evaluation scheme or recommended teaching materials. In the foreword The Canadian Society of Respiratory Technologists states "the methods by which these objectives are achieved are the individual concern of each training centre and respective provincial departments of education" (p.1). The major form of evaluation provided is not directed at the document itself but at the schools offering programs of respiratory technology.

Since the document contains three of the essential elements as identified by the literature and alludes to the fourth element, it is reasonable to conclude that the document does meet the necessary criteria to be classified under the rubric of curriculum.

Curriculum Improvement

Many writers of curriculum theory agree that curriculum improvement and evaluation are essential to ensure that curricula is able to keep in step with a rapidly changing environment. Verdiun (1967) stated that "... curriculum examination, evaluation and revision may be essential to keep educational offerings at a productive level and equal to the demands of a dynamic society and troubled world" (p.1). Anderson (1965, p.141] addresses to the problem of the lag in changes of curriculum

content in light of the proliferation of information brought on by new concepts, ideas and an accelerating rate of research. Scott (1973, p.34) alluded to the same problem in respiratory care in that the proliferation of information has completely changed the concept of respiratory support to such an extent that it has forced physicians to examine their definition of clinical death because of vigorous ventilatory management and resuscitative procedures. It therefore follows that the respiratory technology curriculum must undergo improvement and evaluation on a continual basis. This viewpoint is concurred with by The Canadian Society of Respiratory Technologists since they state in the foreword of their curriculum that "the continual upgrading of the technical and medical curriculum is an important concept in the development of rising national standards for respiratory technology" (p.1).

Since curriculum improvement or revision is necessarily based on evaluation, individual persons and organizations of people, any model of the curriculum improvement process must include these elements (Doll, 1964, p.120). Curriculum evaluation is an appraisal of the student's performance based on the stated objectives of the curriculum. Evaluation should also contain both summative and formative aspects to provide both on-going improvement of the curriculum and evaluation of the final product (Tyler, 1967, p.43).

Verdiun (1967) outlines the importance of identifying curriculum change agents. On this important subject he states:

> When the need for curriculum improvement has been established, the various means and methods must be examined to show the comparative dynamics of each method and to indicate who are the curriculum change agents (p.14).

In their curriculum planning model (Figure 1) Saylor and

Alexander allude to a number of change agents who provide input to curriculum planning. Taba (1962) and Verdiun (1967) also identify change agents that are concerned with curriculum planning. The list includes some of the following:

1. Society
2. School Boards
3. Professional Educators
4. Professional Organizations
5. Government Agencies

In addition to the problem of identifying who the change agents are, Havelock (1973) comments:

> Most of the time, most people do not want change; they want to keep things the way they are, even when outsiders know that change is required. For that reason some change agents are needed just to overcome this inertia, to prod and pressure the system to be less complacent and to start working on its serious problems (p.8).

In order that curriculum improvement can take place on an orderly basis, Verdiun (1967) offers a continuum of curriculum improvement showing the involvement of different curriculum change agents from the outside expert to actual classroom instructor (Figure 6). This model has been modified to show how it could be applied to improving the respiratory curriculum by identifying the change agents who could play an important role in the curriculum evaluation. Within the context of his continuum Verdiun (1967), defines the outside expert as "someone removed completely from the local school system who has made few, if any, visits to the local setting. The outside expert may be a college professor of some academic discipline or, occasionally, a curriculum specialist" (p.15). At the other end of the continuum he defines the

cooperative efforts of instructors as the following: "This change process involves all interested and concerned faculty members within a school or school system" (p.18). The general characteristics of the organization and procedures for curriculum improvement are summarized by Passow (1954) as follows:

> Widest possible participation in planning, testing and evaluating by all persons - professional and lay - who are affected by policy and action decisions; assignment of the individual school to a more central role in curriculum activity; use of groups for initiating, planning, executing, and coordinating improvement efforts; fusion of supervision, in-service education, and curriculum activity to concentrate personnel and processes for the improvement of instruction; experimentation with procedures and devices for more effective involvement; extension of kinds and uses of consultative services from many sources - central office, state department, universities and colleges, for example; use of cooperative research in field situations for improving practices; teamwork from many levels in cooperative enterprises; and development of more effective and widespread leadership (p.221).

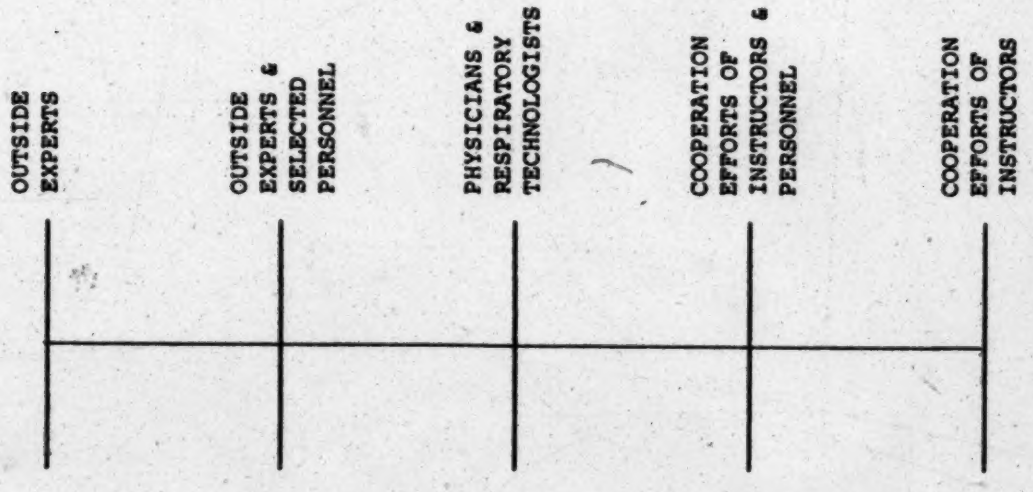
OUTSIDE EXPERTS
OUTSIDE EXPERTS & SELECTED PERSONNEL
PHYSICIANS & RESPIRATORY TECHNOLOGISTS
COOPERATION EFFORTS OF INSTRUCTORS & PERSONNEL
COOPERATION EFFORTS OF INSTRUCTORS

**FIGURE 6.**

**THE CURRICULUM IMPROVEMENT CONTINUUM**

**Modified from Verdiun (1967, p.15)**

Curriculum Research Studies

A review of the indices available for research revealed a large number of curriculum studies done on a wide variety of subjects. Only one study was identified that was directed at respiratory technology. Eubanks, (1973) completed an investigation that dealt with the improvement of respiratory therapy clinical education. Although this research was not directed specifically at curriculum improvement, this topic was alluded to in sections of the final report.

Part of the methodology outlined by Eubanks was a survey instrument of 64 questions divided in five sections:

1. Demographic information
2. Student affairs
3. Administration and faculty
4. Program policy - Structure and philosophy, and
5. Program policy - Specific context.

The research instrument was mailed to 234 individuals involved in respiratory education in hospitals, clinics, community colleges and universities across the United States and 168 completed questionnaires were received. They were then submitted to a panel of experts for commentary (Eubanks, 1973, p.6).

The following comments made by these experts are pertinent to this study.

The final decision on the clinical curriculum content is made by the medical director in 60.5 percent of the programs responding. The college makes the decision in 34.4 percent of the programs; thus, two out of three respondents viewed the physician as the final authority.

Commentary

The physician is closer to the needs of patient care than members of an educational institution. Therefore, a physician should make these decisions or they should be made by a committee with M.D. input (p.14).

Eighty-nine percent of respondents indicated that academic credit for a clinical course is earned by successful completion of the course. Challenge examinations were rated second (53.5 percent), indicating that programs are offering alternative methods for earning course credits such as the recognition of experience.

Commentary

Earning credit by challenging a course seems to be an innovation; however, it is felt that uniform criterion should be established by a program for accepting a candidate and evaluating his knowledge and performance. This type of testing necessitates that the curriculum be well defined into objectives which are measurable.

Job experience is too nebulous and too difficult to evaluate to be used for any significant course credit.

In the absence of prior means for students to obtain advanced standing, the only option the 'more qualified' student has is to ask the certification agency for leniency. The American Registry of Inhalation Therapists (ARIT) now has one admission requirement - graduation from an approved school. The educators must pick up their option. All the ARIT wants is for the school officials to certify the preparation of any graduate to a specified level by giving him a document saying so. It doesn't indicate how the student earned it (p.18).

Fifty-two percent reported that the design of clinical experiences into a curriculum is the shared responsibility of the medical director and the college coordinator (43.7 percent). This pattern is consistent with the collaborative efforts between the college and hospital agent in planning the student's total curriculum.

Commentary

The Medical Director appears to be very active in the overall direction of the program but not active in routine grading. This is desirable although increased medical input into the program at all levels would strengthen the medical aspects of the curriculum.

The physician must never lose his contact with the situation. It all begins with the doctor and a patient. If the physician abdicates this responsibility respiratory therapy will suffer the problems that nursing has suffered. For the most part, the only nurses are in special care units where they work closely with physicians (p.22).

The actual bedside assignments are prepared by the clinical instructor (64.3 percent), the chief therapist (44.8 percent), the educational coordinator (39.4 percent), or a combination of these, although the significant pattern (64.3 percent) indicates that the clinical instructor has primary responsibility.

Commentary

Any of these individuals should be able to make appropriate assignments although the chief therapist should obviously be involved with all patient assignments in the hospital.

The one thing I can assume from this is that the actual bedside assignments are being prepared by the most logical individual, the clinical instructor. Hopefully, the clinical instructor has been made aware of the student's didactic background.

It also indicates that the chief therapist and coordinator plan the clinical curriculum and I do not believe that this is an appropriate way to go. However, if the coordinator or chief therapist coordinates the clinical assignments with the clinical instructor, I think this is even better. Therefore, all the people involved are aware of what the students should be exposed to during their clinical experience (p.22).

In the final discussion on the overall findings of the study the researchers identified a number of areas for conclusion and comment. The only reference to the curriculum was as follows:

> When reviewing the number of areas and hours spent in the various specialty areas, it was remarkable in view of an emerging national emphasis on extended care and getting the patient home, that the majority of the programs are not teaching home care techniques. Is this an area for extensive development in RTT curriculum? (p.35)

## SUMMARY

This chapter was divided into three sections. The first reviewed the literature to determine the definition of the term "curriculum". The second section reviewed contemporary concepts of curriculum development theory. The final section reviewed research related to curriculum change and improvement as it applied to this study.

The literature revealed many varied definitions of the term "curriculum" and presented numerous arguments as to what should constitute a curriculum. Saylor and Alexander (1966) offer a definition that states "Curriculum encompasses all learning opportunities provided by the school" (p.5). At the other end of the continuum of curriculum definitions, Johnson (1969) wrote "curriculum is a structured series of learning outcomes" (p.118). It was identified that The Canadian Society of Respiratory Technologists view the term "curriculum" as a plan of some kind which would fall in the middle of such a continuum.

From the review of the literature, the viewpoints of authorities vary as to the manifestations of the term "curriculum" and the basic components that encompass such a concept. It was clear that a number of authorities concurred that the definition conceptualized by Beauchamp (Short and Marconnit, 1968) is an acceptable definition for the purposes of this study.

> Curriculum is used to identify the plan or design for the educational program of a school or system of schools (p.224).

A review of the literature on curriculum development theory unearthed considerable diversification of viewpoints on the subject. However, examination of a number of models on curriculum development revealed a number of common elements that appear essential to curriculum development theory.

1. Statement of aims and objectives
2. Selection of content
3. Organization of content
4. Evaluation of outcomes

Essential to these elements are also the issues of nature of knowledge, the decision-making process and communications systems.

An analysis of the document labelled Curriculum - Respiratory Technology yielded the presence of three of the essential elements as identified by the literature and a brief discussion was included on the fourth element. From this it was concluded that the document does meet the necessary criteria to be classified as a curriculum.

The final section of Chapter II was devoted to research directed toward the curriculum of respiratory technology. A review of the indices available for research revealed only one study that was pertinent to this investigation. Eubanks (1973) specifically investigated respiratory therapy clinical education and he did allude to certain curriculum matters that were relevant to this study.

1. The final decision on clinical curriculum content should be made by a physician.

2. The curriculum should be well defined into objectives which are measurable.
3. The design of clinical experiences into the curriculum should be the shared responsibility of the medical director and the college program coordinator.
4. Actual bedside assignments should be prepared by the clinical instructor.
5. Home care techniques could be an extensive area for development into the respiratory curriculum.

# CHAPTER III

## INSTRUMENTATION AND METHODOLOGY

Chapter II reviewed the literature to determine a definition for the term "curriculum", the contemporary concepts of curriculum development theory, and finally, examined research pertinent to this study.

This chapter describes in detail the method used in conducting the research. It includes also a description and discussion of the instrument used to collect data for analysis and the methodology employed to bring the study to its conclusion.

Data analyses are presented in Chapter IV.

## INSTRUMENTATION

### The Questionnaire

The questionnaire used to collect data for the study was constructed by the investigator. The instrument designed for this study contained 64 items each of which is a general objective taken from the adult medical and technical sections of the respiratory technologists curriculum which is published by The Canadian Society of Respiratory Technologists (1972). Each objective included in the questionnaire is taken verbatim from the above mentioned curriculum. Provision was provided for evaluation of each objective using a modified five-point Likert scale.

The instrument required the respondent to rate each objective on a scale from:

5. Essential to the curriculum

4. Highly desirable to the curriculum

3. Desirable to the curriculum

2. Of limited importance to the curriculum

1. Of no importance to the curriculum

Space was provided on the research instrument for each respondent to identify additional curriculum items. Respondents were asked to identify objectives that were ambiguously written and lacked clarity.

Two experts, one in the field of curriculum evaluation, and one in instrument design, were consulted during the process of developing the questionnaire. Their criticisms and suggestions for improving the format and wording were considered and incorporated into a preliminary draft of the research instrument. A major recommendation by the experts was that a pilot study be conducted in order that the instrument be validated and constructively criticized by personnel working in the allied health profession of respiratory technology. Other purposes for using the instrument in a pilot study was to determine if each question was properly phrased; and to determine both the minimum and maximum amount of time that it would take the respondents to complete the instrument.

## The Pilot Study

Telephone contact was made by the researcher with the department head of a large hospital in the City of Edmonton to secure permission to conduct a pilot study in his department. This permission was readily granted.

In conducting the pilot study, seven second-year students and three general duty respiratory technologists participated. These personnel did not participate in the major investigation.

To conduct the pilot study, the researcher made a site visit to the hospital to administer and explain to the pilot study participants the research instrument.

The first questionnaire was completed after a 10 minute period of time. The last one was completed after 22 minutes had elapsed. From these two extremes a mean time of 16 minutes was established for the completion of the research instrument by major participants.

After the questionnaire had been completed each participant was invited to make recommendations and comments on the format of the questionnaire. The following recommendations were made:

1. A summary of the rating instructions should be placed at the top of each page.

2. Some objectives were unclear, because they made reference to sections within the curriculum. Some clarification should be included where necessary.

3. Include in the instructions that the respondent must answer all questions.

4. In the section of the questionnaire concerning curriculum additions, it should be made clear that the respondent is required only to include items that fall under the auspices of the adult medical and technical sections of the curriculum.

5. Concern was expressed by the pilot study respondents that they had difficulty distinguishing on the scale between essential, highly desirable and desirable. It was recommended that the term "highly desirable" should be changed to "important".

These recommendations were discussed with both the thesis supervisor and the expert in instrument design. Their reaction was one

of support and recommended that the final draft of the research instrument include the recommendations made by the pilot study participants. Appendix B, page 93, includes a copy of the instrument that was used in the major investigation.

Included with the research questionnaire was a profile sheet for each of the three populations involved in the study. There was a profile sheet for general duty technologists, for supervisory personnel and for instructors.

## The Population and Sample

The population of registered respiratory technologists in Alberta was obtained from the head office of The Canadian Society of Respiratory Technologists in Winnipeg (see Appendix C, page 106). The list identified 162 registered technologists as paid up members of the Society for the fiscal year 1973-74. This list, however, did not identify whether or not the persons were currently employed nor did it establish how many hospitals in the Province of Alberta actually employ respiratory technologists.

To establish this information, the president of the Alberta Society of Respiratory Technologists was contacted and a list of the known hospitals employing respiratory technologists with the names of the respective department heads was developed (see Appendix D, page 108).

Data in Table 1 indicates the number of general duty respiratory technologists, supervisory personnel and instructors employed in each hospital in the Province of Alberta. The table does not include instructors that are employed to teach respiratory technology in the

institutes of technology. These four instructors were included in the researcher's sample that participated in the major investigation, bringing the number of instructors to 11.

TABLE 1

STAFFING COMPLEMENT OF RESPIRATORY TECHNOLOGY DEPARTMENTS FOR HOSPITALS IN THE PROVINCE OF ALBERTA

| LOCATION AND HOSPITAL | SUPERVISORY STAFF EMPLOYED | GENERAL DUTY TECHNOLOGISTS EMPLOYED | INSTRUCTORS EMPLOYED |
|---|---|---|---|
| CALGARY | | | |
| HOLY CROSS | 3 | 8 | 1 |
| FOOTHILLS | 2 | 10 | 1 |
| CALGARY GENERAL | 3 | 15 | - |
| ROCKYVIEW | 1 | 2 | - |
| EDMONTON | | | |
| CHARLES CAMSELL | 1 | 1 [(a)] | 1 |
| ROYAL ALEXANDRA | 6 | 18 | 1 |
| UNIVERSITY OF ALBERTA | 6 | 19 | 1 |
| EDMONTON GENERAL | 3 | 9 | 1 |
| MISERICORDIA | 1 | 6 | 1 |
| ABERHART | 1 | 3 | - |
| W. W. CROSS | 1 | - | - |
| GRANDE PRAIRIE | 1 | - | - |
| LETHBRIDGE | | | |
| ST. MICHAEL'S | 1 | 1 | - |
| LETHBRIDGE MUNICIPAL | 1 | 2 | - |
| MEDICINE HAT | 1 | - | - |
| RED DEER | 1 | 1 | - |
| ST. ALBERT | | | |
| STURGEON GENERAL | 1 | - | - |
| WAINWRIGHT | 1 | - | - |
| WETASKIWIN | 1 | - | - |
| TOTAL | 36 | 95 | 7 |

(a) One member of this department was not a member of The Canadian Society of Respiratory Technologists and was excluded from the study

## The Sample Selection

Since the numbers involved in the categories of supervisory personnel and instructors was low, it was decided to involve those total populations in the study. In the category of general duty technologist a random sample was taken. In order to identify the random sample, the researcher made on-site visits to all hospitals having more than two general duty technologists. The random sample was made on the basis of either two or 20 percent of the population of general duty technologists that were employed, whichever figure was greater. The department head in each hospital visited was consulted with by the researcher to identify the participants to be involved in the study. The means of identifying the specific individuals was by using a table of random numbers to select the persons from the staff duty roster. All hospitals having two or less general duty personnel were automatically included in the sample. This methodology yielded 29 persons as the sample for general duty technologists.

# PROFILE DESCRIPTION OF RESPONDENTS

## Instructor Profile

The instructor population of Alberta which included both hospital instructors and instructors at the institutes of technology totalled 11: 6 males and 5 females. All completed the research instrument. Data from the profile sheets show that the mean years of experience as instructors was 3.3, with their mean age being 28.4 years. Sixty-three percent of the instructors have worked only at one hospital. Four of the 11 instructors were employed at the institutes of technology,

2 in Edmonton and 2 in Calgary. The institute instructors have a mean years of teaching experience of 4 years. This figure is significant because it also shows the years that instructors at the institutes of technology have been away from clinical experience.

Data from the profile sheet showed all the instructors obtained their registration from The Canadian Society of Respiratory Technologists, and, in addition, have taken a four week in-service pedagogy course from either the Southern Alberta Institute of Technology or the Northern Alberta Institute of Technology. One instructor has a Bachelor of Science degree, while two others are proceeding towards a Bachelor of Education degree.

Supervisory Personnel Population

The supervisory personnel population of Alberta totalled 36. Thirty-two of these individuals submitted completed questionnaires. One supervisor was unable to respond due to hospitalization at the time of the study; one other questionnaire was mutilated and not included in the sample. At least one supervisor from every hospital employing respiratory technologists completed and returned the questionnaire.

Of the supervisors responding 28 were male and 4 were female. The profile sheet data showed the mean years of experience for supervisors to be 3.4 years, with the mean age being 33.[1] Porty-six percent of the supervisors have only worked in one hospital. All the supervisors have obtained their registration from The Canadian Society of Respiratory Technologists.

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[1]This mean could be higher or lower because one female did not reveal her age.

General Duty Technologist Sample

The general duty registered technologist population of Alberta totalled 95, out of which a random sample of 29 was selected to participate in the study. All 29 returned completed questionnaires. The sample consisted of 6 males and 23 females. Data analysed from the profile sheet showed the mean age for general duty technologists to be 24.5 years. Their mean years of experience after registration was 2.7 years. Forty-nine percent of these respondents have only worked in one hospital. All general duty technologists in the sample obtained their registration from The Canadian Society of Respiratory Technologists.

An analysis of data from Table 2 shows that all general duty technologists were registered since 1968, with 10 being registered in 1971.

TABLE 2

YEAR OF REGISTRATION FOR RESPIRATORY TECHNOLOGISTS WHO PARTICIPATED IN THE STUDY

| GROUP | YEAR OF REGISTRATION (C.S.R.T.) | | | | | | | | | | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1964 | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 | 1973 | |
| INSTRUCTOR | - | - | 1 | 1 | 4 | 2 | 1 | 1 | 1 | - | 11 |
| SUPERVISOR | 2 | 2 | 5 | 2 | 5 | 3 | 4 | 7 | 2 | - | 32 |
| GENERAL DUTY STAFF | - | - | - | - | - | 2 | 6 | 10 | 3 | 8 | 29 |
| TOTAL | 2 | 2 | 6 | 3 | 9 | 7 | 11 | 18 | 6 | 8 | 72 |

Schools of Graduation

Data from the profile sheets indicated that the majority of the respondents graduated from the Northern Alberta Institute of Technology and an affiliated hospital. Only three persons graduated from schools of respiratory technology outside of the Province of Alberta. A breakdown of schools of graduation is provided in Table 3.

TABLE 3

SCHOOL OF GRADUATION OF R.R.T.s PRACTISING IN HOSPITALS IN THE PROVINCE OF ALBERTA

| GROUP | SCHOOL OF GRADUATION | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | NAIT/HOSPITAL | SAIT/HOSPITAL | CALGARY HOSPITAL | ROYAL ALEXANDRA HOSPITAL | MISERICORDIA HOSPITAL | EDMONTON GENERAL HOSPITAL | UNIVERSITY OF ALBERTA HOSPITAL | OUT OF PROVINCE | TOTAL |
| INSTRUCTOR | 4 | - | 4 | 2 | - | - | 1 | - | 11 |
| SUPERVISOR | 13 | 1 | 5 | 3 | 1 | 1 | 6 | 2 | 32 |
| GENERAL DUTY STAFF | 23 | 3 | 1 | 1 | - | - | - | 1 | 29 |
| TOTAL | 40 | 4 | 10 | 6 | 1 | 1 | 7 | 3 | 72 |

## METHODOLOGY

A letter was sent to each department head of respiratory technology requesting his cooperation in the conducting of the research and provision of a breakdown of his staffing complement. Table 1 summarizes the responses. All the department heads responded to the researcher's request. Once written permission had been granted to conduct the research study, a follow up phone call was made to the hospitals to establish a suitable time period in which the research instrument could be distributed.

Questionnaires with letters of explanation were then delivered personally by the researcher to all the hospitals in the Edmonton vicinity, Red Deer, and Calgary during the first two weeks of February, 1974. Each hospital was given a number of questionnaires in accordance with their staffing complement.

All the supervisors in the respiratory department were invited to participate in the study, the instructor, should the department have one, was included, and two or 20 percent of the general duty staff made up the balance of the sample studied. The methodology of the selection of general duty technologists was outlined on page 52.

Since all the other hospitals in the province employing respiratory technologists did not have more than two general duty technologists on staff, the questionnaires were mailed to this group. An on-site visitation was not necessary as no random sample procedure was required. Questionnaires with letters of explanation were mailed out to the hospitals in Wainwright, Wetaskiwin, Grande Prairie, Lethbridge, and Medicine Hat on February 14, 1974 (Appendix E).

On the research instrument each respondent was instructed to review each objective and to record on the questionnaire the degree of essentiality on a five-point scale that the objective has to the curriculum for training respiratory technologists as perceived by himself. In addition, the respondent was instructed to indicate if any of the 64 objectives were unclear or ambiguous. Also, they were requested to add in the space provided on the questionnaire any important curriculum items that were omitted. A profile sheet was attached to each questionnaire.

Returned questionnaires were scored, and the data tabulated in tables for future analysis.

Scoring and Data Processing

The data required to test the 64 null hypothesis was obtained from the returned questionnaires. The rating of each objective was based on a five-point scale ranging from "essential to the curriculum" to "of no importance to the curriculum". The response category of "essential" was assigned a weight of 5 while the response category "of no importance" had a weight of 1.

The information from the questionnaire was transferred to IBM cards and the processing of data was completed at the University of Alberta, Department of Computing Services, utilizing a program from the Division of Educational Research Services. The data was analysed using a standard one way analysis of variance program applying the fixed effect model for equal or unequal observations in each group (ANOV 15). The level of significance for this study was set *a priori* at the 0.1 level.

# CHAPTER IV

## ANALYSIS OF DATA

Chapter III provided a detailed description of the population involved in the study and described in detail the methodology used to bring the research to its conclusion.

The focus of this chapter is directed at the statistics that are directly related to the investigation of the null hypotheses of this study. In addition, data on objective (curricular sub-element) evaluation, additional curriculum items and respondent comments from the research instrument are presented in this chapter.

### Sample Returns

In Table 4, an analysis of sample returns is presented. Of a total of 76 questionnaires distributed, 72 were returned. This represents an overall return of 94.6 percent. Data from Table 4 show that 29 out of 29 general duty technologists completed the research instrument, representing 100 percent return. Thirty-two out of 36 supervisors responded, representing an 88.8 percent return; and 11 out of 11 instructors completed the questionnaire, representing 100 percent return.

### Null Hypotheses

It may be recalled from Chapter I that the major question to be answered was, "Are there any significant differences between the perceptions of essentiality of the curricular sub-elements by the three levels of respiratory technologists?" To answer this question, 64 null

TABLE 4

R.R.T.s[(a)] IN ALBERTA INVOLVED IN STUDY AND PERCENTAGE OF QUESTIONNAIRES RETURNED

| GROUP | POPULATION OF R.R.T.s | R.R.T.s INVOLVED IN STUDY | COMPLETED INSTRUMENTS RETURNED | PERCENTAGE OF RETURNS |
|---|---|---|---|---|
| GENERAL DUTY TECHNOLOGIST | 94 | 29 | 29 | 100.0 |
| SUPERVISOR | 36 | 36 | 32 | 88.8 |
| INSTRUCTOR | 11 | 11 | 11 | 100.0 |
| TOTALS | 141 | 76 | 72 | 94.6 |

(a) Registered Respiratory Technologist

hypotheses were established, one for each curricular sub-element identified on the questionnaire. Each null hypothesis states: "that there is no significant difference in the perception of essentiality for the curricular sub-element between the three groups of respiratory personnel".

It was found that there was significant differences at the 0.1 level using a standard one way analysis of variance computation in 12 of the curricular sub-elements analysed. Table 5 provides the mean rating of each curricular sub-element by each group of respiratory technologists. The null hypothesis for curricular sub-elements 1, 2, 4, 18, 22, 36, 43, 44, 45, 46, 59, and 60 were rejected as each had a P level of less than 0.1. The following is a specific analysis of each of the rejected null hypotheses.

TABLE 5

MEAN RESPONSE OF THE THREE PARTICIPATING GROUPS

FOR EACH CURRICULAR SUB-ELEMENT

| CURRICULAR SUB-ELEMENT | MEAN SCORES[a] | | | OVERALL MEAN | SIGNIFICANT DIFFERENCE? |
|---|---|---|---|---|---|
| | G.D.T.[b] | SUP.[c] | INST.[d] | | P |
| 1 | 3.8 | 4.0 | 3.1 | 3.8 | Yes |
| 2 | 3.3 | 3.9 | 3.3 | 3.6 | Yes |
| 3 | 3.9 | 4.2 | 3.3 | 4.0 | |
| 4 | 3.8 | 4.3 | 3.6 | 4.0 | Yes |
| 5 | 4.0 | 4.3 | 4.4 | 4.2 | |
| 6 | 4.2 | 4.4 | 4.5 | 4.3 | |
| 7 | 4.8 | 4.9 | 4.9 | 4.9 | |
| 8 | 4.7 | 4.9 | 4.9 | 4.8 | |
| 9 | 4.9 | 4.7 | 4.9 | 4.8 | |
| 10 | 4.9 | 4.8 | 4.7 | 4.8 | |
| 11 | 4.8 | 4.8 | 5.0 | 4.8 | |
| 12 | 4.4 | 4.6 | 4.5 | 4.5 | |
| 13 | 4.3 | 4.4 | 4.2 | 4.3 | |
| 14 | 4.4 | 4.5 | 4.5 | 4.5 | |
| 15 | 4.6 | 4.6 | 4.5 | 4.6 | |
| 16 | 4.6 | 4.5 | 4.6 | 4.5 | |
| 17 | 4.6 | 4.7 | 4.6 | 4.7 | |
| 18 | 4.7 | 4.4 | 4.1 | 4.5 | Yes |
| 19 | 4.8 | 4.6 | 4.5 | 4.6 | |
| 20 | 4.7 | 4.7 | 4.4 | 4.6 | |
| 21 | 4.3 | 4.0 | 4.2 | 4.2 | |

TABLE 5 (continued)

| CURRICULAR SUB-ELEMENT | MEAN SCORES[a] | | | OVERALL MEAN | SIGNIFICANT DIFFERENCE? |
|---|---|---|---|---|---|
| | G.D.T.[b] | SUP.[c] | INST.[d] | | P |
| 22 | 4.4 | 3.9 | 4.0 | 4.1 | Yes |
| 23 | 4.8 | 4.9 | 4.9 | 4.9 | |
| 24 | 4.0 | 4.2 | 4.4 | 4.1 | |
| 25 | 4.7 | 4.7 | 4.8 | 4.7 | |
| 26 | 4.4 | 4.6 | 4.6 | 4.5 | |
| 27 | 4.1 | 4.1 | 3.7 | 4.0 | |
| 28 | 4.6 | 4.6 | 4.5 | 4.6 | |
| 29 | 4.4 | 4.4 | 4.0 | 4.3 | |
| 30 | 3.9 | 4.1 | 4.1 | 4.0 | |
| 31 | 5.0 | 4.8 | 4.9 | 4.9 | |
| 32 | 4.7 | 4.5 | 4.3 | 4.5 | |
| 33 | 4.0 | 3.9 | 3.9 | 3.9 | |
| 34 | 3.0 | 3.3 | 3.2 | 3.2 | |
| 35 | 2.7 | 3.1 | 3.1 | 2.9 | |
| 36 | 3.0 | 3.6 | 3.7 | 3.4 | Yes |
| 37 | 5.0 | 5.0 | 5.0 | 5.0 | |
| 38 | 4.5 | 4.4 | 4.3 | 4.4 | |
| 39 | 4.5 | 4.5 | 4.4 | 4.5 | |
| 40 | 5.0 | 4.9 | 4.8 | 4.9 | |
| 41 | 4.7 | 4.6 | 4.3 | 4.6 | |
| 42 | 4.6 | 4.3 | 4.2 | 4.4 | |
| 43 | 4.9 | 4.7 | 4.6 | 4.8 | Yes |
| 44 | 4.7 | 4.5 | 4.1 | 4.5 | Yes |

TABLE 5 (continued)

| CURRICULAR SUB-ELEMENT | MEAN SCORES[a] | | | OVERALL MEAN | SIGNIFICANT DIFFERENCE? |
|---|---|---|---|---|---|
| | G.D.T.[b] | SUP.[c] | INST.[d] | | P |
| 45 | 4.9 | 4.7 | 4.8 | 4.8 | Yes |
| 46 | 4.7 | 4.5 | 4.2 | 4.5 | Yes |
| 47 | 4.6 | 4.6 | 4.5 | 4.6 | |
| 48 | 4.1 | 4.1 | 4.1 | 4.1 | |
| 49 | 4.1 | 3.9 | 4.3 | 4.0 | |
| 50 | 4.8 | 4.8 | 4.9 | 4.8 | |
| 51 | 4.6 | 4.6 | 4.5 | 4.6 | |
| 52 | 4.6 | 4.8 | 4.7 | 4.7 | |
| 53 | 4.8 | 4.8 | 4.8 | 4.8 | |
| 54 | 4.9 | 4.9 | 4.9 | 4.9 | |
| 55 | 4.8 | 4.8 | 4.9 | 4.8 | |
| 56 | 4.9 | 4.9 | 4.9 | 4.9 | |
| 57 | 4.5 | 4.4 | 4.7 | 4.5 | |
| 58 | 4.8 | 4.7 | 4.8 | 4.8 | |
| 59 | 4.1 | 3.8 | 4.3 | 4.0 | Yes |
| 60 | 4.0 | 3.8 | 4.4 | 4.0 | Yes |
| 61 | 4.5 | 4.6 | 4.7 | 4.6 | |
| 62 | 4.5 | 4.7 | 4.8 | 4.6 | |
| 63 | 4.9 | 4.9 | 4.9 | 4.9 | |
| 64 | 4.8 | 4.6 | 4.8 | 4.7 | |
| OVERALL MEANS | 4.4 | 4.4 | 4.3 | 4.4 | |

(a) All scores rounded to one decimal place
(b) General Duty Technologist
(c) Supervisor
(d) Instructor

Curricular Sub-Element 1

On the research instrument this curricular sub-element stated:

1. Relate the technical and physiological discoveries that created the need for this study.

From a probability matrix for Scheffe multiple comparison of means, the data revealed that there was a significant difference between the perceptions of essentiality of the curricular sub-element by the instructors and the supervisors. The mean rating of the item by instructors was 3.1 while the supervisors rated it 4.0. There was no significant differences observed between the perceptions of general duty technologists and supervisors, and between the instructors and the general duty technologists.

Curricular Sub-Element 2

On the research instrument this curricular sub-element stated:

2. Have a sense of loyalty to the profession by relating the birth, growth and present day philosophies of the Society to the health care team.

From a probability matrix for Scheffe multiple comparison of means, the data revealed that there was a significant difference between the perceptions of essentiality of the curricular sub-element by the general duty technologists and the supervisors. The mean rating of the item by the general duty technologists was 3.3 while the supervisors rated it 3.9. There was no significant differences observed between the perceptions of the instructors and the general duty technologists and between the instructors and supervisors.

Curricular Sub-Element 4

On the research instrument this curricular sub-element stated:

4. Continually adapt and modify his moral code as outlined by the code of ethics into his daily conduct.

The one way analysis of variance between groups identified that there were some differences in the observed scores. However, a pairwise comparison of group means using the Scheffe method did not yield any significant differences between the groups. Since the purpose of the study was to identify differences between groups, the null hypothesis was not rejected for curricular sub-element 4.

Curricular Sub-Element 18

On the research instrument this curricular sub-element stated:

18. Clearly define the term ventilator.

From a probability matrix for Scheffe multiple comparison of means, the data revealed that there was a significant difference between the perceptions of essentiality of the curricular sub-element by the instructors and the general duty technologists. The mean rating of the item by the instructors was 4.1 while the general duty technologists rated it 4.7. There was no significant differences observed between the perceptions of the instructors and the supervisors and between the supervisors and the general duty technologists.

Curricular Sub-Element 22

On the research instrument this curricular sub-element stated:

22. Understand and systematize classification of ventilators.

From a probability matrix for Scheffe multiple comparison of

means, the data revealed that there was a significant difference between the perceptions of essentiality of the curricular sub-element by the general duty technologists and the supervisors. The mean rating of the item by the general duty technologists was 4.4 while the supervisors rated it 4.0. There were no significant differences observed between the perceptions of the instructors and the supervisors and between the instructors and the general duty technologists.

Curricular Sub-Element 36

On the research instrument this curricular sub-element stated:

36. List and demonstrate the safety aspects of anesthesia administration.

From a probability matrix for Scheffe multiple comparison of means, the data revealed that there was a significant difference between the perceptions of essentiality of the curricular sub-element by the general duty technologists and the supervisors. The mean rating of the item by the general duty technologists was 3.0 while the supervisors rated it 3.6. There were no significant differences observed between the perceptions of the instructors and the supervisors and between the instructors and the general duty technologists.

Curricular Sub-Element 43

On the research instrument this curricular sub-element stated:

43. Know the constitutional symptoms that are related to respiratory disease.

From a probability matrix for Scheffe multiple comparison of means, the data revealed that there was a significant difference between the perceptions of essentiality of the curricular sub-element by the

general duty technologists and the supervisors. The mean rating of the item by the general duty technologists was 4.9 while the supervisors rated it 4.6. There were no significant differences observed between the perceptions of the instructors and the supervisors and between the instructors and the general duty technologists.

Curricular Sub-Element 44

On the research instrument this curricular sub-element stated:

44. Analyse respiratory problems in terms of the specific patterns of respiratory disease.

From a probability matrix for Scheffe multiple comparison of means, the data revealed that there was a significant difference between the perceptions of essentiality of the curricular sub-element by the general duty technologists and the instructors. The mean rating of the item by the general duty technologists was 4.7 while the instructors rated it 4.1. There were no significant differences observed between the perceptions of the instructors and the supervisors and between the supervisors and the general duty technologists.

Curricular Sub-Element 45

On the research instrument this curricular sub-element stated:

45. Functionally classify respiratory disorders in terms of obstructive, restrictive and gas exchange problems and be able to explain a specific example relating to each problem.

From a probability matrix for Scheffe multiple comparison of means, the data revealed that there was a significant difference between the perceptions of essentiality of the curricular sub-element by the general duty technologists and the supervisors. The mean rating of the

item by the general duty technologists was 4.9 while the supervisors rated it 4.7. There were no significant differences observed between the perceptions of the general duty technologists and the supervisors and the instructors.

Curricular Sub-Element 46

On the research instrument this curricular sub-element stated:

46. Know the principal clinical and laboratory findings that are pertinent to the recognition of respiratory problems.

From a probability matrix for Scheffe multiple comparison of means, the data revealed that there was a significant difference between the perceptions of essentiality of the curricular sub-element by the general duty technologists and the instructors. The mean rating of the item by the general duty technologists was 4.7 while the instructors rated it 4.2. There were no significant differences observed between the perceptions of the general duty technologists and the supervisors and between the supervisors and the instructors.

Curricular Sub-Element 59

On the research instrument this curricular sub-element stated:

59. Know the essential clinical features and the basic laboratory findings that lead to the diagnosis of heart disease.

The one way analysis of variance between groups identified that there were some differences in the observed scores. However, a pairwise comparison of group means using the Scheffe method did not yield any significant differences between the groups. Since the purpose of the study was to identify differences between groups, the null

hypothesis was not rejected for curricular sub-element 59.

Curricular Sub-Element 60

On the research instrument this curricular sub-element stated:

> 60. Know the types of cardiac problems that may occur and be able to give an example of each type, e.g. congenital, ischemic, valvular, and hypotensive.

From a probability matrix for Scheffe multiple comparison of means, the data revealed that there was a significant difference between the perceptions of essentiality of the curricular sub-element by the instructors and the supervisors. The mean rating of the item by the instructors was 4.4 while the supervisors rated it 3.8. There were no significant differences observed between the perceptions of the general duty technologists and the instructors and between the general duty technologists and the supervisors.

The Other Null Hypotheses

Based on the data analysed and results of a one way analysis of variance computation, the remaining 52 null hypotheses were not rejected.

Rating as to Clarity of the Curricular Sub-Elements

On the questionnaire each respondent was asked to do the following:

> Now that you have rated each objective based on your experience, please reread each objective and if the objective is unclear as to its meaning to you, please circle the number of that objective.

An analysis of the questionnaires in reference to this item revealed that 31 out of 72 respondents questioned the clarity of the

of the curricular sub-elements by circling at least one objective representing a 43 percent response. No respondent circled objectives 1, 9, 10, 40, 47, 51, or 63. The remaining objectives received at least one rating of unclear while curricular sub-element 16 received 12 responses questioning the clarity of that statement; while the remaining sub-elements received a minimum of one rating of unclear.

Additional Curriculum Items

On the research instrument each respondent was asked to do the following:

> Please write in any items that, in your opinion, should be in the adult medical and technical sections of the curriculum that are currently omitted.

Forty-three out of 72 respondents identified at least one item that should be included in the curriculum representing a 59.6 percent response. Seventeen out of 32 supervisors responded to this question representing a 53 percent response; 21 out of 29 general duty technologists responded representing a 72.5 percent response; and 5 out of 11 instructors responded representing a 45.5 percent response.

The following is a list of those items identified by the registered respiratory technologists in Alberta that should be included in the respiratory curriculum or that should have a specific objective written to cover the identified item.

1. Cardiology - Physiology, monitoring, cardiopulmonary relationships, and reading of electrocardiograms. (General duty technologists - 9; supervisors - 5, instructors - 1)

2. Blood gases - more stress on blood gas values in disease, interpretive procedures, fluid and electrolyte balance, and technique of arterial punctures. (General duty technologists - 3, supervisors - 5, instructors - 1)

3. Objectives required for the additional ventilatory adjuncts - PEEP, CPAP, IMV. (General duty technologists - 1, supervisors - 2, instructors - 1)

4. I.P.P.B. - No specific section for this important topic. (General duty technologists - 2, supervisors - 2)

5. General airway management especially endotracheal and tracheostomy care. (General duty technologists - 1, supervisors - 1, instructors - 1)

6. Chest x-ray interpretation. (General duty technologists - 1, supervisors - 4, instructors - 1)

7. Basic skills of inspection, palpation, percussion, and auscultation. (General duty technologists - 3, supervisors - 1)

8. Chest physiotherapy and postural drainage. (General duty technologists - 3, supervisors - 3)

9. More information should be given on anesthesia equipment. (General duty technologists - 1)

10. Pulmonary function testing procedures including shunt and dead space calculations. (General duty technologists - 1, supervisors - 3)

11. Instillation and deep suctioning techniques. (Supervisors - 1)

12. Diagnostic procedures such as bronchoscopy and needle biopsy. (General duty technologists - 1, supervisors - 1)

13. Better coverage required on ventilators - pediatric ventilation, monitoring of continuous patients, and the PR2. (General duty technologists - 3, supervisors - 3)

14. Patient assessment procedures especially those related to effectiveness of therapy. (Supervisors - 1)

15. Equipment evaluation procedures. (Supervisors - 1)

16. Departmental management including personnel and equipment management and budgeting procedures. (General duty technologists - 1, supervisors - 1)

17. Format and general procedure for the composition of medical and technical reports. (General duty technologists - 1)

18. Oxygen requirements for patients suffering from COPD (with and without exercise). (Supervisors - 1)

19. Knowledge of abdominal diseases and surgery and their implications for the respiratory system. (Supervisors - 1)

20. Basic electronics as it applies to respiratory technology. (Supervisors - 2)

Pertinent Curricular Comments

In addition to the previous identified instructions on the research instrument, the respondents were invited to write in any other comments which related to curriculum matters. The following comments resulted from this request.

1. Nine respondents expressed concern that "pharmacology was a subject area that should be stressed more heavily in respiratory education".

2. Six respondents requested that "a course of instruction be established on the psychology of the sick and dying patient and the interpersonal relationships involved in treating such patients".

3. "Low rating for curricular sub-element 36 due to experience in larger hospitals, could be very important in smaller centres".

4. "The items circled are improper wording only. Fully recognizing these are not behavioural objectives, terms such as know and understand are unacceptable even in general objectives in my opinion".

5. "The importance of team work should be stressed".

6. "Closer relationship between first year students and hospital should be developed".

7. "Wording of objectives was too vague".

8. "I feel that before any technologist is hired for an instructor's position they should have X years experience. There should be a program or course set up which should be mandatory for instructors to attend and complete satisfactorily. An inspection should be made of the recognised teaching hospitals to ensure that a satisfactory program is being carried out by the instructor".

9. "More objectives should be included especially those related to physics and continuous ventilation".

10. "A good technical background in respiratory equipment would be sufficient knowledge for most anesthetic machines".

# CHAPTER V

## SUMMARY, OBSERVATIONS, CONCLUSIONS, AND RECOMMENDATIONS

The final chapter of this thesis is divided into three sections. The first section is a summary of the research methodology. The second section includes observations, conclusions and recommendations stemming from the research. The third and final section includes recommendations for further research.

## SUMMARY

### The Problem

The major objective of this research was to determine if there were significant differences between the perceptions of essentiality of the curricular sub-elements held by general duty respiratory technologists, respiratory supervisory personnel and respiratory instructors in Alberta. The curricular sub-elements used in this study were taken from the adult medical and technical sections of the respiratory curriculum published by The Canadian Society of Respiratory Technologists.

In addition to its major objective, the study sought to identify curricular sub-elements which in the opinion of the three groups were vague or ambiguous, and to gain from these respiratory personnel their reactions for additional curriculum topics which are not included in the published curriculum.

Comparisons of the responses of the three groups were made to determine significant differences in perceptions of essentiality. All

significant data related to each curricular sub-element identified on the research instrument were tabulated and analysed to determine major findings.

## Related Literature

A review of research literature revealed that there were no other studies undertaken in Canada that were directly related to this research. Textbooks related to curriculum, curriculum design, and curriculum modification and change were reviewed to identify what authorities consider to be the basic components of a curriculum. From this review it was found that the curriculum published by The Canadian Society of Respiratory Technologists contained three of four basic components. Hence the researcher classified the document as a *bona fide* curriculum.

## Methodology

In the medical and technical portions of the respiratory curriculum 64 objectives are listed. Using these objectives as questionnaire statements, a modified five-point Likert scale was designed to rate each of these objectives. Prior to using the research instrument in the major study, the questionnaire was reviewed by the major thesis advisor and a specialist in instrument design at the University of Alberta.

One of their major recommendations was that a pilot study be conducted. A large hospital in the City of Edmonton was contacted and a pilot study conducted. Participants in the pilot study were not involved in the major study.

The results of the pilot study indicated that portions of the research questionnaire needed further clarification and modification before being used in the major study. The findings of the pilot study were included in the final draft of the research instrument.

To construct a profile of the participants a profile information sheet was appended to the questionnaire.

In order to find out if there were any significant differences among the perceptions of essentiality of the three levels of respiratory personnel, 64 null hypotheses were established. These 64 null hypotheses stated that: there are no significant differences in the perception of essentiality of the three levels of personnel (for each curricular sub-element).

During February, 1974, the questionnaire was administered to a random sample of 29 practicing general duty technologists, the total population of 11 respiratory instructors, and 36 respiratory supervisory personnel. The data obtained from the completed questionnaire was transferred to IBM cards and analysed by the University of Alberta Computing Services using an analysis of variance program with Alpha Set at the 0.1 level of significance. All curricular sub-elements with P being less than 0.1 were discussed in Chapter IV. The mean scores of each participating group for each curricular sub-element is provided in Chapter IV, Table 5. All personal data obtained in the research were tabulated and discussed in Chapter III.

## Findings

The following major findings were generated from an analysis

of data collected with the research instrument. These data revealed that of the 64 curricular sub-elements, 10 were identified in which there were significant differences among perceptions of essentiality of the three groups of respiratory technologists who participated in this study.

## Curricular Sub-Elements with Significant Differences Among Perceptions of Groups

Data from the research instrument revealed 10 curricular sub-elements in which there were significant differences observed among the perceptions of essentiality of the participating groups involved in the study.

### Curricular Sub-Element 1

> Relate the technical and physiological discoveries that created the need for this technology.

Significant differences were found between supervisors and instructors with the instructors rating the objective lower than supervisors.

### Curricular Sub-Element 2

> Have a sense of loyalty to the profession by relating the birth, growth and present day philosophies of the Society to the health care team.

Significant differences were identified between general duty technologists and supervisors with general duty technologists rating this sub-element lower than supervisors.

### Curricular Sub-Element 18

> Clearly define the term ventilator.

Between instructors and general duty technologists significant differences were found for this curricular sub-element. Instructors rated this sub-element lower than did general duty technologists.

Curricular Sub-Element 22

Understand and systematize classification of ventilators.

Significant differences were identified between supervisors and general duty technologists, with supervisors rating this sub-element lower than general duty technologists.

Curricular Sub-Element 36

List and demonstrate the safety aspects of anesthesia administration.

For this sub-element significant differences were found between general duty technologists and supervisors, with general duty technologists rating it lower than did the supervisors.

Curricular Sub-Element 43

Know the constitutional systems that are related to respiratory disease.

Supervisors rated this objective lower than did general duty technologists.

Curricular Sub-Element 44

Analyse respiratory problems in terms of the specific patterns of respiratory disease.

Data revealed that significant differences existed between general duty technologists and instructors for this curricular sub-element with the instructors rating it lower than the general duty technologists.

Curricular Sub-Element 45

Functionally classify respiratory disorders in terms of obstructive, restrictive, and gas exchange problems and be able to explain a specific example relating to each problem.

Significant differences exist between general duty technologists and supervisors for this objective with supervisors rating this curricular sub-element lower than general duty technologists.

Curricular Sub-Element 46

Know the principal clinical and laboratory findings that are pertinent to recognition of respiratory problems.

For this objective significant differences were found between general duty technologists and instructors, with the instructors rating this objective lower than general duty technologists.

Curricular Sub-Element 60

Know the types of cardiac problems that may occur and be able to give an example of each type - e.g. congenital, ischemic, valvular, and hypotensive.

Significant differences were identified for this curricular sub-element between instructors and supervisors, with supervisors rating this objective lower than instructors.

No significant differences for the remaining 54 curricular sub-elements were found among any of the participating groups. Hence these null hypotheses were not rejected.

Rating as to Clarity of the Curricular Sub-Elements

Thirty-one out of 72, or 43 percent, of the respondents questioned the clarity of at least one curricular sub-element. Overall,

the respondents indicated 57 of the 64 curricular sub-elements as being either unclearly or ambiguously written. Only objectives 1, 9, 10, 40, 47, 51, and 63 escaped criticism.

## Additional Curriculum Items

Of 72 respondents 43 identified at least one curriculum item they felt should be included in the curriculum so that it would meet the needs of respiratory technologists working in hospitals in the province. Tabulation of these responses identified 20 additional curriculum items that should be included in the curriculum guide. A complete list of these items is provided in Chapter IV, page 69.

## Pertinent Curriculum Comments

Twenty-three participants made additional comments that were pertinent to the curriculum. Many of the 23 comments were similar and were condensed to 10 comments. A detailed listing of these comments is presented in Chapter IV, page 71.

## Overall Rating of the Curriculum

The mean overall rating of the technical and medical sections of the respiratory curriculum by the three participating groups was 4.4 on the five-point scale. Only one objective out of the 64 curricular sub-elements received an overall rating of less than 3.0. That was curricular sub-element number 35 which reads:

> Explain the design, construction, mechanical theory and application of secondary anesthetic equipment used in operating theatres.

## OBSERVATIONS

The following observation was drawn from the research data. Those curricular sub-elements that related to anesthesia and anesthetic equipment received a lower rating than did other technical objectives from the three groups of respiratory technologists that participated in the study. This included objective number 35 which received a rating of less than three on the five-point scale.

## CONCLUSIONS

On the basis of the findings of this study, the following conclusions are drawn:

1. In general, it would appear that the general duty technologist perceives medical curriculum objectives with a higher degree of essentiality than either the instructors or the supervisors.
2. In general, many of the curricular sub-elements (objectives) of the respiratory curriculum are unclear or ambiguous.
3. Respiratory technologists in the Province of Alberta are not closely involved with the operating theatre and the management of anesthetic equipment.
4. In general, the curriculum as established by The Canadian Society of Respiratory Technologists is in accord with the perceptions of essentiality of respiratory technologists in Alberta.

5. In general, the overall population of respiratory technologists is young in both age and years of experience with the majority of the personnel graduating after 1969.
6. Respiratory technologists in the Province of Alberta are not very mobile and tend to remain in the hospital in which they were trained or initially employed.
7. In general, institute of technology respiratory instructors have been away from clinical practice for at least four years.
8. The scope of practice of respiratory technology in Alberta is extending beyond the curriculum as recommended by The Canadian Society of Respiratory Technologists.

## RECOMMENDATIONS

The conclusions reached in this research point out the following recommendations:

1. Since the general duty technologist rated the medical curricular sub-element as being more essential than was perceived by either the supervisors or instructors, it is recommended that The Canadian Society of Respiratory Technologists examine its guidelines for selection of membership to its Education and Curriculum Committee to ensure that the general duty technologists are adequately represented on that committee.
2. Data from this study revealed that 57 of the 64 curricular sub-elements were rated as being unclear or ambiguous. It

is recommended that The Canadian Society of Respiratory Technologists either charge its Education and Curriculum Committee with the responsibility of rewriting all the objectives within the curriculum or enlist the assistance of members of a Faculty of Education to ensure such objectives are written in performance terms.

3. The respondents involved in the research identified 20 additional curriculum items that they felt should be included in viable respiratory curriculum. It is recommended that The Canadian Society of Respiratory Technologists strike a panel of experts to examine these 20 items as to their essentiality and then ensure that those items that are viable in the opinion of the panel are added to the curriculum as soon as possible.
4. The findings from this study yielded one sub-element received a rating of less than three, implying that it was of limited importance to respondents. It is recommended that curricular sub-element number 35 be reviewed by the panel of experts and a decision made concerning the deletion of the objective from the curriculum.
5. Data in the study infer that the scope of practice for respiratory technology is changing rapidly. In order that practicing technologists keep up with the proliferation of knowledge required by this allied health profession, a vigorous ongoing continuing education program should be conducted by the major training institutions in

cooperation with the Alberta Society of Respiratory Technologists.

6. Data from the research instrument revealed that of 11 instructors, both clinical and at the institutes of technology, only two have received some form of pedagogical training at a university. It is recommended that instructors, either clinical or at the institutes of technology, actively pursue admission to a university program of studies in education that will lead to a baccalaureate degree.

7. Data from the profile sheet yielded information that instructors at the institutes of technology have been away from clinical experience for an average of four years. It is strongly recommended that these instructors be encouraged to take advantage of industrial or educational leave that is available to them from the institutes of technology. The purpose of this leave would be to allow the instructor to undergo clinical exposure in a hospital in order that the institute instructor keep pace with the rapidly changing technology associated with respiratory technology.

8. The respiratory curriculum requires ongoing review and evaluation as well as a mechanism by which additional objectives can be added or deleted to the curriculum to make it relevant for the practicing R.R.T.

## PROBLEMS FOR FURTHER STUDY

This study is not an exhaustive one and many questions, related to the overall respiratory curriculum, are left unanswered. The following suggestions for further research are made.

1. The scope of this study was limited to the Province of Alberta. In order to establish a national rating for each curricular sub-element by respiratory technologists across Canada, it would be necessary to replicate this study on a nationwide basis. Such a study should be undertaken by The Canadian Society of Respiratory Technologists or commissioned to a suitable agency as soon as possible.
2. This study was limited to the technical and medical sections of the respiratory curriculum. All the sections contained within the respiratory curriculum should be similarly investigated.
3. This research was limited to registered technologists in the Province of Alberta. The methodology used in this study could be replicated involving interested physicians and senior respiratory students. Such a study would be in accord with the Eubanks research in which his respondents were strongly in favour of physician input, especially in the clinical setting.
4. One of the findings of this study was that respiratory technologists in the Province of Alberta do not perceive their role to include servicing and maintenance of anesthesia equipment. It would be interesting to research

current hospital practices directed toward servicing of anesthesia equipment in hospitals in Alberta. Such an investigation could determine who services anesthesia equipment and determine a possible role respiratory technologists might have in this activity.

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# APPENDIX A

## A LETTER MAILED TO EACH DEPARTMENT HEAD TO ACQUAINT THEM WITH THE PURPOSE OF STUDY

FACULTY OF EDUCATION
DEPARTMENT OF INDUSTRIAL AND
VOCATIONAL EDUCATION
TELEPHONE (403) 432-3678



THE UNIVERSITY OF ALBERTA
EDMONTON, ALBERTA, CANADA
T6G 0Y1

LETTER SENT TO ALL DEPARTMENT HEADS

January 14, 1974

Dear

As you are probably aware, I am currently on leave from the Northern Alberta Institute of Technology to attend the University of Alberta to complete a Master of Education degree. One of the requirements for the conferring of the degree is the completion of a thesis. The topic I have chosen for my thesis is, "Curricular Perceptions of Respiratory Technologists in Alberta", which in essence examines how technologists in the field view the published curriculum as put out by The Canadian Society of Respiratory Technologists. The research design of this project calls for the cooperation of Department Heads, Supervisors and Instructors of the Respiratory Technology Department in each hospital in the province. In addition, the cooperation of a random sample of general duty technologists will be required to complete the data collection.

The methodology of data collection will be an on-site visit by the researcher to each hospital to administer a 64 item questionnaire and respondent profile sheet of the above-mentioned individuals. Once all the data have been collected, it will be analysed by the researcher and the results made known to those who participated in this study.

I would be most grateful if you would offer your cooperation to permit me the privilege to visit the personnel of your department to administer the research instrument. The proposed time plan for the study is the first two weeks of Feburary and I would be most grateful if you would indicate any days that would not be suitable during that time.

Thank you for your kind assistance and once the study is complete, a copy of the abstract will be forwarded to you.

Yours truly,

M. B. Andrews
Graduate Student

## APPENDIX B

## THE INSTRUMENT USED IN THE MAJOR INVESTIGATION

## INSTRUCTIONS FOR THE QUESTIONNAIRE

### INTRODUCTION

The following questionnaire contains 64 objectives which are taken directly from the curriculum as published by the C.S.R.T. (1972).

It is an underlying assumption by the Society that these objectives taken from the technical and medical sections of the curriculum represent essential knowledge and skills that must be learned by all students of respiratory technology.

It is the purpose of this questionnaire to ascertain if the objective is essential and to find out the degree of essentiality as perceived by yourself based upon your preparation and experience as a respiratory technologist.

### INSTRUCTIONS

Please read each objective carefully and rate all the objectives on a five point scale based on the following:

5. ESSENTIAL TO THE CURRICULUM
4. IMPORTANT TO THE CURRICULUM
3. DESIRABLE TO THE CURRICULUM
2. OF LIMITED IMPORTANCE TO THE CURRICULUM
1. OF NO IMPORTANCE TO THE CURRICULUM

Once the 64 objectives have been rated, add any items that, in your opinion, have been omitted from the curriculum plus any other comments that would be pertinent to this study. In addition, could you please fill out the profile sheet on the back of the questionnaire.

Thank you for your cooperation.

## TECHNICAL CURRICULAR SUB-ELEMENTS

Summary of instructions:

5. Essential to the curriculum
4. Important to the curriculum
3. Desirable to the curriculum
2. Of limited importance to the curriculum
1. Of no importance to the curriculum

| | | |
|---|---|---|
| 1. | Relate the technical and physiological discoveries that created the need for this technology. | 5 4 3 2 1 |
| 2. | Have a sense of loyalty to the profession by relating the birth, growth and present day philosophies of the Society to the health care team. | 5 4 3 2 1 |
| 3. | Discuss and relate the basic principles of professional ethics and sound business methods on which to build the science of Respiratory Technology. | 5 4 3 2 1 |
| 4. | Continually adapt and modify his moral code as outlined by the code of ethics into his daily conduct. | 5 4 3 2 1 |
| 5. | Identify the various related medical gases and describe their method of production. | 5 4 3 2 1 |
| 6. | Identify and compare the methods of storage and supply of medical gases. | 5 4 3 2 1 |
| 7. | Knowingly differentiate safe practices involving the storage, handling and administration of medical gases. | 5 4 3 2 1 |
| 8. | List and describe the various methods of administration (of medical gases). | 5 4 3 2 1 |
| 9. | Give the approximate $PAO_2$ that each method may deliver for therapy and the problems that may influence or alter gas concentration in the airways. | 5 4 3 2 1 |
| 10. | Identify the equipment used in administration and differentiate between the various methods utilized. | 5 4 3 2 1 |

## TECHNICAL CURRICULAR SUB-ELEMENTS

Summary of instructions:

5. Essential to the curriculum
4. Important to the curriculum
3. Desirable to the curriculum
2. Of limited importance to the curriculum
1. Of no importance to the curriculum

| | | |
|---|---|---|
| 11. | List and demonstrate the safety aspect of administration | 5 4 3 2 1 |
| 12. | Describe the methods and principles incorporated for precise gas control. | 5 4 3 2 1 |
| 13. | Know the definitions and concepts that are listed under section "A", Definitions and Physics. (of humidification, e.g. relative humidity) | 5 4 3 2 1 |
| 14. | Identify and list the various artificial methods and principles of generating humidity. | 5 4 3 2 1 |
| 15. | Describe and contrast the uses and applications of various humidifying and aerosol devices. | 5 4 3 2 1 |
| 16. | Apply their developed surgical conscience to themselves, their patients and the equipment they use, by utilizing correct techniques and procedures. | 5 4 3 2 1 |
| 17. | Recognize, identify and destroy contamination. | 5 4 3 2 1 |
| 18. | Clearly define the term ventilator. | 5 4 3 2 1 |
| 19. | Comprehend and explain the various terms utilized in this section. (Ventilators, e.g. Volume Limited) | 5 4 3 2 1 |
| 20. | Analyze, contrast and formulate the basic functional requirements for ventilators as discussed under inspiration, expiration and changeover phases. | 5 4 3 2 1 |
| 21. | Describe, contrast and explain the design, construction and mechanical theory of various ventilators. | 5 4 3 2 1 |

TECHNICAL CURRICULAR SUB-ELEMENTS

Summary of instructions:

5. Essential to the curriculum
4. Important to the curriculum
3. Desirable to the curriculum
2. Of limited importance to the curriculum
1. Of no importance to the curriculum

| | | |
|---|---|---|
| 22. | Understand and systematize classification of ventilators. | 5 4 3 2 1 |
| 23. | Select the most appropriate equipment best suited to meet the needs of specific patient situations. | 5 4 3 2 1 |
| 24. | Explain and contrast the sources of vacuum and the respective limitations and advantages of each in order to provide the best service to the hospital and patient's needs. | 5 4 3 2 1 |
| 25. | List and demonstrate the safety procedures involved in the application of vacuum for patient care. | 5 4 3 2 1 |
| 26. | Combine his theoretical and technical knowledge of vacuum in a clinical situation for optimum patient care. | 5 4 3 2 1 |
| 27. | Know the definitions of the terms aspiration and vacuum and utilize such terms in the appropriate circumstances. | 5 4 3 2 1 |
| 28. | Apply and interpret techniques used for routine pulmonary assessment. | 5 4 3 2 1 |
| 29. | Compute list and explain the standard pulmonary tests utilizing up-to-date terminology. | 5 4 3 2 1 |
| 30. | Know the principles of operation and the methods for computing functional residual capacity. | 5 4 3 2 1 |
| 31. | Analyse and evaluate ventilatory and acid base status from blood gas analysis. | 5 4 3 2 1 |
| 32. | Effectively do blood gas analysis on at least one common blood gas machine. | 5 4 3 2 1 |

## TECHNICAL CURRICULAR SUB-ELEMENTS

Summary of instructions:

5. Essential to the curriculum
4. Important to the curriculum
3. Desirable to the curriculum
2. Of limited importance to the curriculum
1. Of no importance to the curriculum

| | | |
|---|---|---|
| 33. | List the four methods of blood gas analyses. | 5 4 3 2 1 |
| 34. | Describe, contrast and explain the design, construction and mechanical theory of various anesthetic machines used in the hospital. | 5 4 3 2 1 |
| 35. | Explain the design, construction, mechanical theory, and application of secondary anesthetic equipment used in operating theatres. | 5 4 3 2 1 |
| 36. | List and demonstrate the safety aspects of anesthesia administration. | 5 4 3 2 1 |
| 37. | Demonstrate and apply techniques of cardiac and pulmonary resuscitation. | 5 4 3 2 1 |
| 38. | List, compare and contrast the manual ventilators in common hospital use. | 5 4 3 2 1 |
| 39. | Differentiate between the various airway tubes utilized in resuscitation and identify the appropriate tube for a specific case. | 5 4 3 2 1 |

## MEDICAL SUB-CURRICULAR ELEMENTS

| | | |
|---|---|---|
| 40. | List the major symptoms and signs of respiratory disease. | 5 4 3 2 1 |
| 41. | Know some of the mechanisms involved in the development of dyspnea. | 5 4 3 2 1 |
| 42. | State the sources of chest pain and relate the origin to possible respiratory disease. | 5 4 3 2 1 |
| 43. | Know the constitutional symptoms that are related to respiratory disease. | 5 4 3 2 1 |

## MEDICAL CURRICULAR SUB-ELEMENTS

Summary of instructions:

5. Essential to the curriculum
4. Important to the curriculum
3. Desirable to the curriculum
2. Of limited importance to the curriculum
1. Of no importance to the curriculum

| | | |
|---|---|---|
| 44. | Analyse respiratory problems in terms of the specific patterns of respiratory diseases. | 5 4 3 2 1 |
| 45. | Functionally classify respiratory disorders in terms of obstructive, restrictive and gas exchange problems and be able to explain a specific example relating to each problem. | 5 4 3 2 1 |
| 46. | Know the principal clinical and laboratory findings that are pertinent to recognition of respiratory problems. | 5 4 3 2 1 |
| 47. | Define the term restrictive defect. | 5 4 3 2 1 |
| 48. | Divide restrictive defects into the four fundamental components, namely:<br>(a) neurological<br>(b) neuromuscular<br>(c) muscular and thoracic cage<br>(d) structural abnormailities of the respiratory apparatus | 5 4 3 2 1 |
| 49. | Give specific examples of disease processes or states that demonstrate each of the above divisions, and be able to explain briefly why each problem leads to a restrictive defect. | 5 4 3 2 1 |
| 50. | Know the various treatments offered by respiratory technologists which would be of value to a patient with restrictive defect. | 5 4 3 2 1 |
| 51. | Define the term obstructive defect. | 5 4 3 2 1 |
| 52. | Name the major factors which influence airway resistance and know the normal physiological mechanisms which affect airway size. | 5 4 3 2 1 |
| 53. | Know the major signs and symptoms of chronic obstructive pulmonary disease. | 5 4 3 2 1 |

## MEDICAL CURRICULAR SUB-ELEMENTS

Summary of instructions:

5. Essential to the curriculum
4. Important to the curriculum
3. Desirable to the curriculum
2. Of limited importance to the curriculum
1. Of no importance to the curriculum

| | | | | | | |
|---|---|---|---|---|---|---|
| 54. | Apply his knowledge of obstructive diseases and perform the appropriate therapy as prescribed by the physician. | 5 | 4 | 3 | 2 | 1 |
| 55. | Know the pathophysiology of gas exchange problems and relate such knowledge to the respiratory treatment of such a patient. | 5 | 4 | 3 | 2 | 1 |
| 56. | Recognize acute and chronic respiratory failure, define such a condition, and know the appropriate clinical respiratory management required to maintain such a patient. | 5 | 4 | 3 | 2 | 1 |
| 57. | Define the term "shock" and know the important clinical factors involved in patient management. | 5 | 4 | 3 | 2 | 1 |
| 58. | Recognize the close interrelationship between the cardiac and respiratory systems and give examples demonstrating such a relationship. | 5 | 4 | 3 | 2 | 1 |
| 59. | Know the essential clinical features and basic laboratory findings that lead to the diagnosis of heart disease. | 5 | 4 | 3 | 2 | 1 |
| 60. | Know the types of cardiac problems that may occur and be able to give an example of each type - e.g. congenital, ischemic, valvular, and hypotensive. | 5 | 4 | 3 | 2 | 1 |
| 61. | Explain the basic methods of management of cardiac problems as they pertain to respiratory technology. | 5 | 4 | 3 | 2 | 1 |
| 62. | Know the effects of major abdominal and thoracic surgery on the respiratory system and relate such knowledge to the clinical respiratory management of such a patient. | 5 | 4 | 3 | 2 | 1 |

## MEDICAL CURRICULAR SUB-ELEMENTS

Summary of instructions:

5. Essential to the curriculum
4. Important to the curriculum
3. Desirable to the curriculum
2. Of limited importance to the curriculum
1. Of no importance to the curriculum

63. Select the most appropriate equipment best suited to meet the needs of specific patient situations. 5 4 3 2 1

64. Maintain and (where possible) repair all ventilators. 5 4 3 2 1

PLEASE CONTINUE ON THE NEXT PAGE

1. Curriculum Omissions

Please write in any items that, in your opinion, should be in the adult medical and technical sections of the curriculum that are currently omitted.

2. Objective Evaluation

Now that you have rated each objective based on your experience, please rereard each objective and if the objective is unclear as to meaning to you, please circle the number of that objective.

3. Additional Comments

If there are any pertinent comments you would like to add concerning this study, please write them in overleaf.

RESPONDENT PROFILE SHEET - GENERAL DUTY TECHNOLOGISTS

The following information is required by the researcher in order to develop a profile of the participants involved in this study.

1. Current institution of employment.

_____

2. Number of hospitals previously employed in.

_____

_____

_____

3. Name of respiratory school attended.

_____

4. Year of graduation.

_____

5. Year C.S.R.T. registration was obtained.

_____

6. Number of years of experience after graduation as a General Duty Technologist.

_____

7. Age

_____

8. Sex

_____

## RESPONDENT PROFILE SHEET - SUPERVISOR

The following information is required by the researcher in order to develop a profile of the participants involved in this study.

1. Current institution of employment.

_____

2. Number of hospitals previously employed in.

_____

_____

_____

3. Name of respiratory school attended.

_____

4. Year of graduation.

_____

5. Year C.S.R.T. registration was obtained.

_____

6. Number of years of experience as a supervisor.

_____

7. Age

_____

8. Sex

_____

## RESPONDENT PROFILE SHEET - INSTRUCTOR

The following information is required by the researcher in order to develop a profile of the participants involved in this study.

1. Current institution of employment.

_____

2. Number of hospitals previously employed in.

_____

3. Name of respiratory school attended.

_____

4. Year of graduation.

_____

5. Year C.S.R.T. registration was obtained.

_____

6. Number of years of experience as an instructor.

_____

7. Age

_____

8. Sex

_____

9. Education - What course work have you completed since graduation as an R.T.?

_____

_____

## APPENDIX C

## A LETTER MAILED TO THE HEAD OFFICE OF THE CANADIAN SOCIETY OF RESPIRATORY TECHNOLOGISTS

January 3, 1974

Mr. H. Friesen
Executive Secretary, C.S.R.T.
395 Waterloo Street
Winnipeg, Manitoba
R3N 037

Dear Mr. Friesen:

As you are aware I am currently on leave from the Northern Alberta Institute of Technology to attend the University of Alberta to complete a Master of Education degree. One of the requirements for the conferring of the degree is the completion of a thesis. The topic I have chosen for my thesis is, "Curricular Perceptions of Respiratory Technologists in Alberta", which in essence examines how technologists in the field view the published curriculum as put out by the Canadian Society of Respiratory Technologists. The research design of this project calls for the cooperation of the Society in supplying the names and addresses of all the registered technologists in the Province of Alberta to the researcher.

I would be most grateful if you could supply me with the necessary information at your earliest convenience.

A copy of the abstract of the thesis will be submitted to the Society upon completion of the research.

Yours truly,

M. B. Andrews
Graduate Student

COPY

## APPENDIX D

## DEPARTMENT HEADS OF KNOWN HOSPITALS EMPLOYING RESPIRATORY TECHNOLOGISTS

## DEPARTMENT HEADS - RESPIRATORY TECHNOLOGY

Mr. D. B. Andrews
CHARLES CAMSELL HOSPITAL
Edmonton

Mr. D. Smailes
ROYAL ALEXANDRA HOSPITAL
Edmonton

Mr. H. Janisch
UNIVERSITY OF ALBERTA HOSPITAL
Edmonton

Mr. A. Baril
EDMONTON GENERAL HOSPITAL
Edmonton

Mr. J. Lewchuk
W. W. CROSS CANCER INSTITUTE
Edmonton

Mr. F. Gafke
MISERICORDIA HOSPITAL
Edmonton

Mr. D. Hunt
STURGEON GENERAL HOSPITAL
St. Albert

Mr. R. Saint
GRANDE PRAIRIE HOSPITAL
Grande Prairie

Mr. M. Yarish
RED DEER GENERAL HOSPITAL
Red Deer

Mr. J. H. Coward
FOOTHILLS HOSPITAL
Calgary

Mr. A. Zimmerman
HOLY CROSS HOSPITAL
Calgary

Mr. E. Zaiss
ROCKYVIEW HOSPITAL
Calgary

Mr. R. Snyder
MEDICINE HAT GENERAL HOSPITAL
Medicine Hat

Mr. M. Scott
LETHBRIDGE MUNICIPAL HOSPITAL
Lethbridge

Mr. R. Furman
WETASKIWIN HOSPITAL
Wetaskiwin

Mr. K. Sznerch
ST. MICHAEL'S HOSPITAL
Lethbridge

Mr. R. King
WAINWRIGHT HOSPITAL
Wainwright

## APPENDIX E

## A LETTER SENT TO HOSPITALS EMPLOYING LESS THAN TWO GENERAL DUTY RESPIRATORY TECHNOLOGISTS

FACULTY OF EDUCATION
DEPARTMENT OF INDUSTRIAL AND VOCATIONAL EDUCATION
TELEPHONE (403) 432-3678



THE UNIVERSITY OF ALBERTA
EDMONTON, ALBERTA, CANADA
T6G 0Y1

LETTER SENT TO ALL DEPARTMENT HEADS

February 14, 1974

Dear

As you are probably aware, I am currently on leave from the Northern Alberta Institute of Technology to attend the University of Alberta to complete a Master of Education degree. One of the requirements for the conferring of the degree is the completion of a thesis. The topic I have chosen for my thesis is, "Curricular Perceptions of Respiratory Technologists in Alberta", which in essence examines how technologists in the field view the published curriculum as put out by The Canadian Society of Respiratory Technologists. The research design of this project calls for the cooperation of Department Heads, Supervisors and Instructors of the Respiratory Technology Department in each hospital in the province. In addition, the cooperation of a random sample of general duty technologists will be required to complete the data collection.

The methodology of data collection will be the administration of a 64-item questionnaire and respondent profile sheet to the above-mentioned individuals. Once all the data have been collected, it will be analysed by the researcher and the results made known to those who participated in this study.

I would be most grateful if you would offer your cooperation and complete the enclosed questionnaire and return it to me by February 22, 1974. Also could you please give the questionnaires provided to your full time registered staff.

Thank you for your kind assistance and once the study is complete, a copy of the abstract will be forwarded to you.

Yours truly,

M. B. Andrews
Graduate Student

# VITA

Name: Michael Bruce Barrington Andrews
Place of Birth: Bradfield, England
Year of Birth: 1942

Post Secondary Education and Degrees:

Montreal Institute of Technology
Montreal, Quebec
1957-1961 - Diploma of Technology (Industrial Electronics)

Royal Victoria Hospital
Montreal, Quebec
1961-1963 - Diploma in Inhalation Therapy

Canadian Society of Respiratory Technologists
Winnipeg, Manitoba
1964 - Registration in Respiratory Technology

Sir George Williams University
Montreal, Quebec
1963-1967

University of Alberta
Edmonton, Alberta
1968-1970 - Bachelor of Education

University of Alberta
Edmonton, Alberta
1972-1974 - Master of Education

Honours:

University of Alberta
Edmonton, Alberta
1970 - Bachelor of Education with Distinction

Learned Societies:

Phi Delta Kappa
Canadian Society of Respiratory Technologists

Related Work Experience:

Assistant Supervisor
Department of Inhalation Therapy
Royal Victoria Hospital
Montreal, Quebec
1963-1964

Department Head
Inhalation Therapy Department
Lakeshore General Hospital
Pointe Claire, Quebec
1965-1967

Senior Instructor
Respiratory Technology
Northern Alberta Institute of Technology
Edmonton, Alberta
1967-1974

Publications:

Andrews, M. B. "An Instructor, Fact or Fiction", Respiratory Technology. Volume 8, No. 2, June, 1972.

Andrews, M. B. "A Comparison of Schools", Respiratory Technology. Volume 7, No. 4, December, 1971.

Andrews, M. B. and Andrews, D. B. "Respiratory - Some Thoughts and Concepts", Canadian Inhalation Therapy. Volume 4, No. 1, March, 1968.

Andrews, M. B. and Van Reede, H. "Edmonton's Approach to Training", Canadian Inhalation Therapy. Volume 3, No. 4, December, 1967.

Andrews, M. B. and Van Reede, H. "Northern Alberta Takes Major Step Towards Extensive Training Program", Hospital Administration in Canada. Volume 10, No. 9, September, 1968.

Andrews, M. B., Coward, J. H. and Comolli, R. L. "Respirocardiac Resuscitation", Canadian Inhalation Therapy. Volume 3, No. 1, March, 1967.

Andrews, M. B. "Growth of Respiratory Technology in Alberta", Hospital Administration in Canada. Volume 11, No. 9, September, 1972.

Andrews, M. B. "Humidification", Canadian Inhalation Therapy. Volume 2, No. 3, September, 1966.

Andrews, M. B. "Psychological Implications of Cystic Fibrosis", Canadian Inhalation Therapy. Volume 5, No. 4, December, 1969.

Andrews, M. B. "Respiratory Care and Cystic Fibrosis", Canadian Hospital. Volume 50, No. 3, March, 1973.